



Consommation et
Affaires commerciales Canada

Consumer and
Corporate Affairs Canada

Bureau des brevets

Patent Office

Ottawa, Canada
K1A 0C9

(21) (A1)	2,086,132
(22)	1992/12/23
(43)	1994/06/24

5,085,9/46

(51) INTL.CL. ⁵ E05D-015/22

(19) (CA) **APPLICATION FOR CANADIAN PATENT** (12)

(54) Central Locking Device with Improved Hardware

(72) Goldenberg, Shaul - Canada ;

(73) Same as inventor

(57) 13 Claims

Notice: This application is as filed and may therefore contain an
incomplete specification.

Canada

CCA 3254 (10-92) 41 7530-21-936-3254

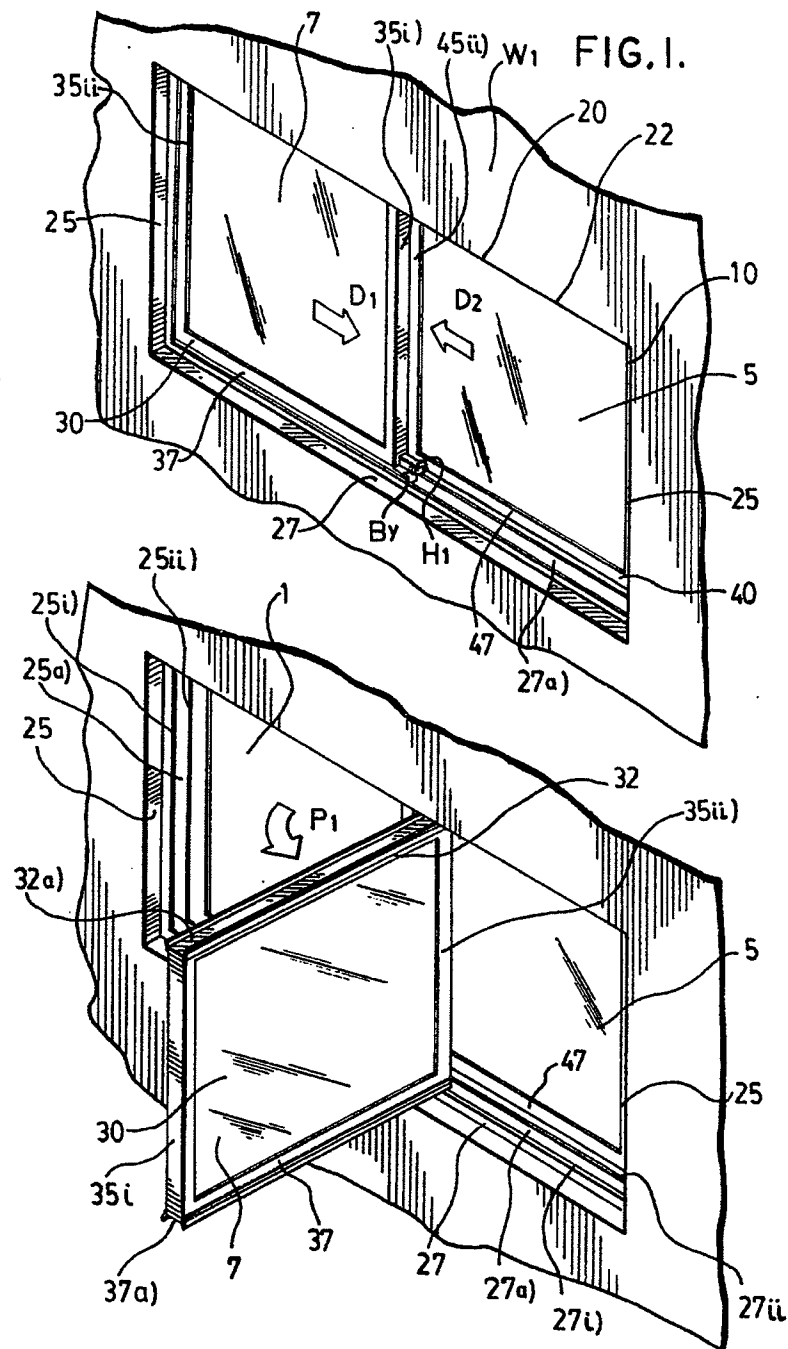
A pivot assembly for use with a pivoting and sliding closure assembly disposed in an opening, the closure assembly having track portions, the closure assembly having at least one closure member slidable within said track portions and pivotable at one end of the closure member and latchable proximate the other end of the closure member,

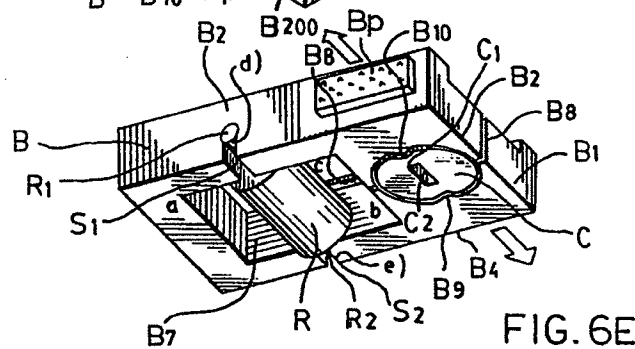
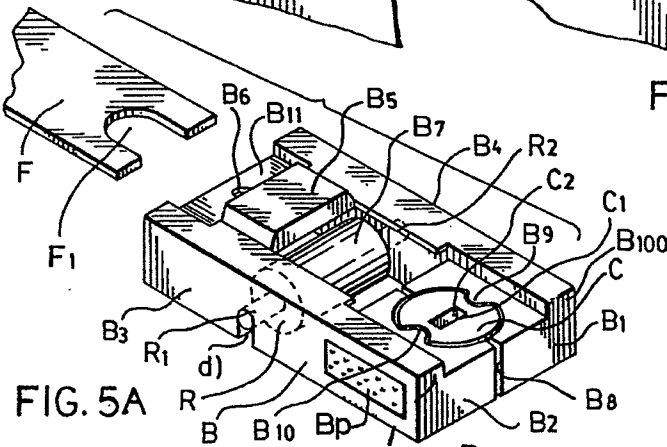
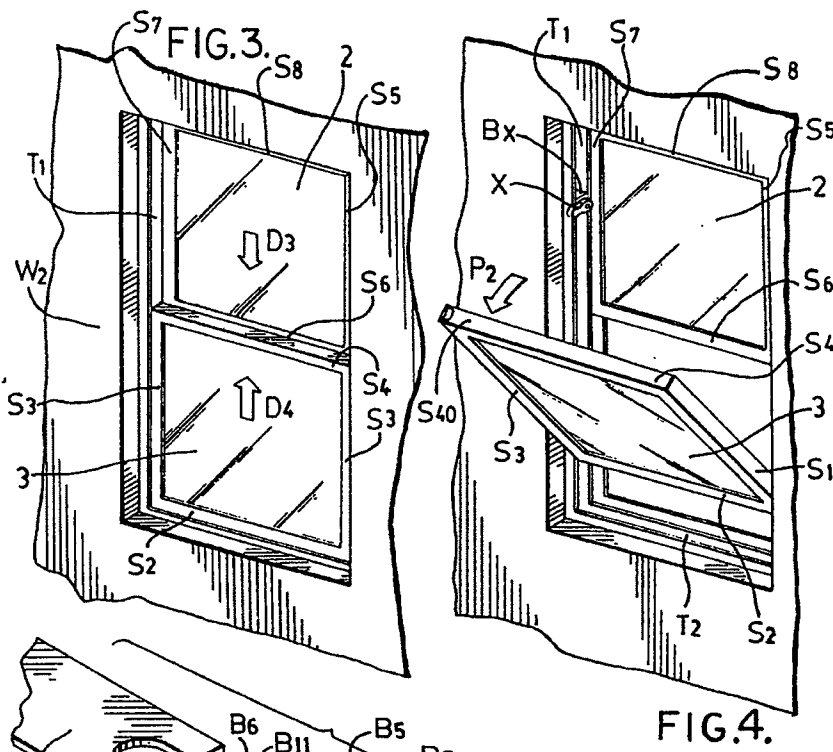
the pivot assembly comprising a carrier portion having two ends and being a continuous three dimensional supporting member extending substantially along the length of the closure member and slideable within said track portions, and having means for mounting hardware means disposed proximate each end of the carrier portion, (preferably said carrier portion being of substantially uniform cross section extending between said means for mounting hardware means disposed proximate each end of said carrier portion),

the means for mounting hardware means of said carrier portion adjacent the pivotable end of the at least one closure member having means to lock the carrier portion from sliding movement within the track portions, wherein when the at least one closure member pivots, the means to lock the carrier portion from sliding movement in the track portions is activated,

the means for mounting hardware means of said carrier portion adjacent the latchable end of the at least one closure member having latching means for latching the at least one closure member to prevent the closure member from pivoting at the pivotable end of the closure member when the closure member remains slideable within said track,

the at least one closure member being braced from sagging by the the carrier portion disposed in each track, the carrier portion further preventing the closure member from disengaging from the carrier portion adjacent the pivotable end of the at least one closure member when the at least one closure member is rotated to an open position.





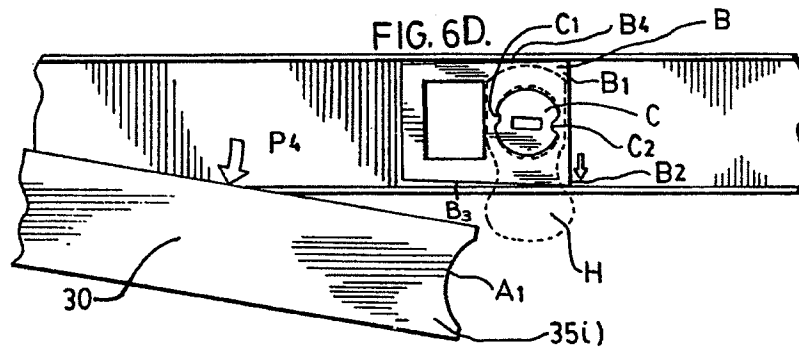
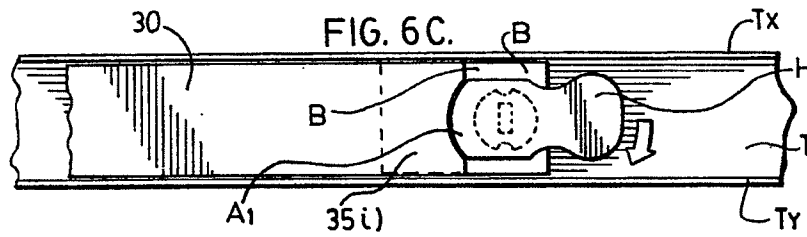
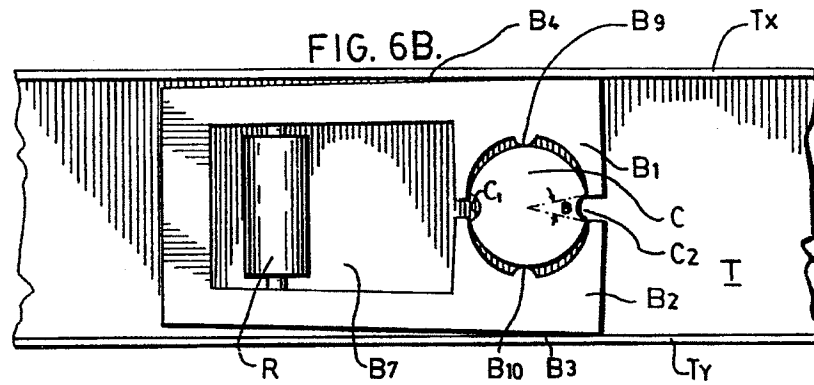
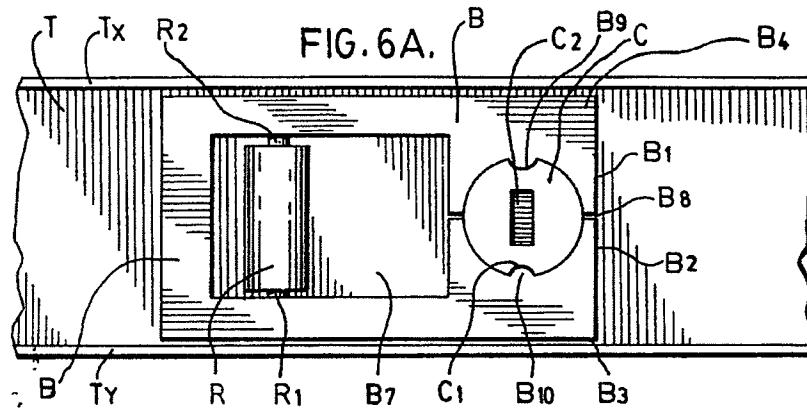


FIG. 6F

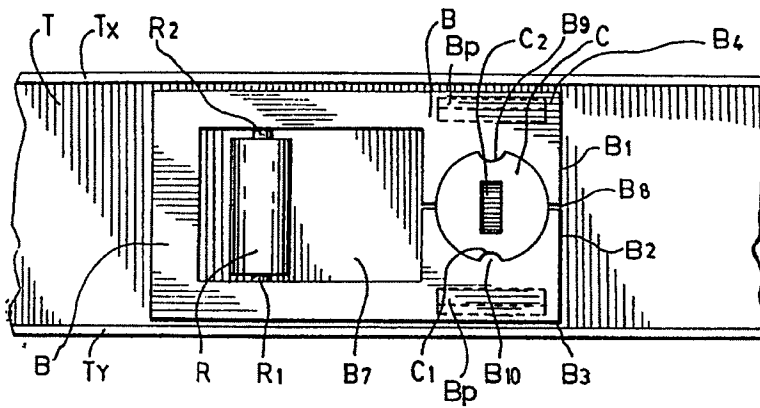


FIG. 6G

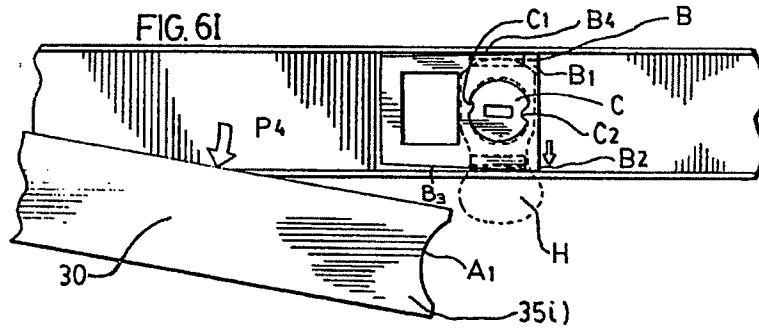
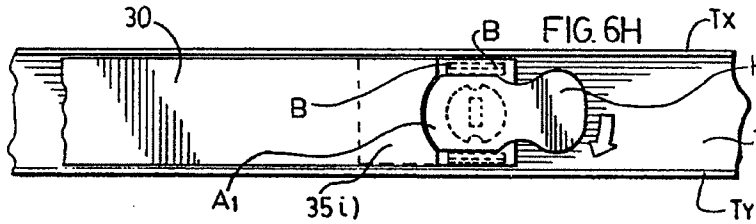
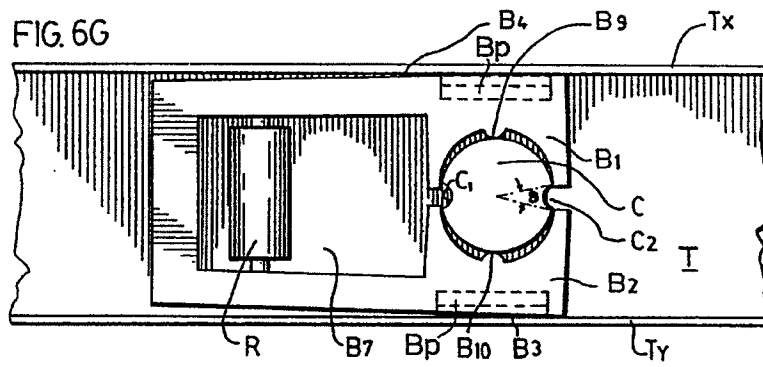


FIG. 6J



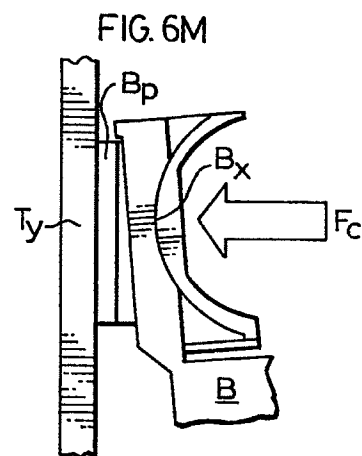
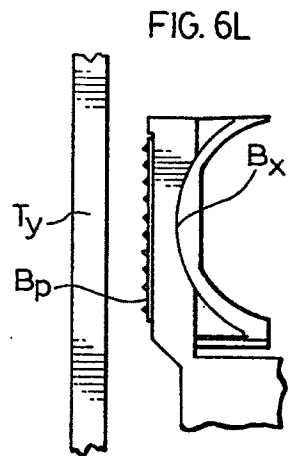
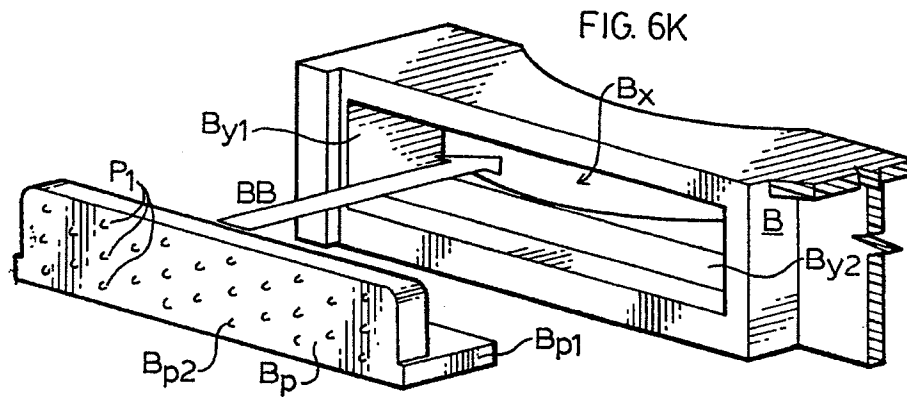


FIG. 7B.

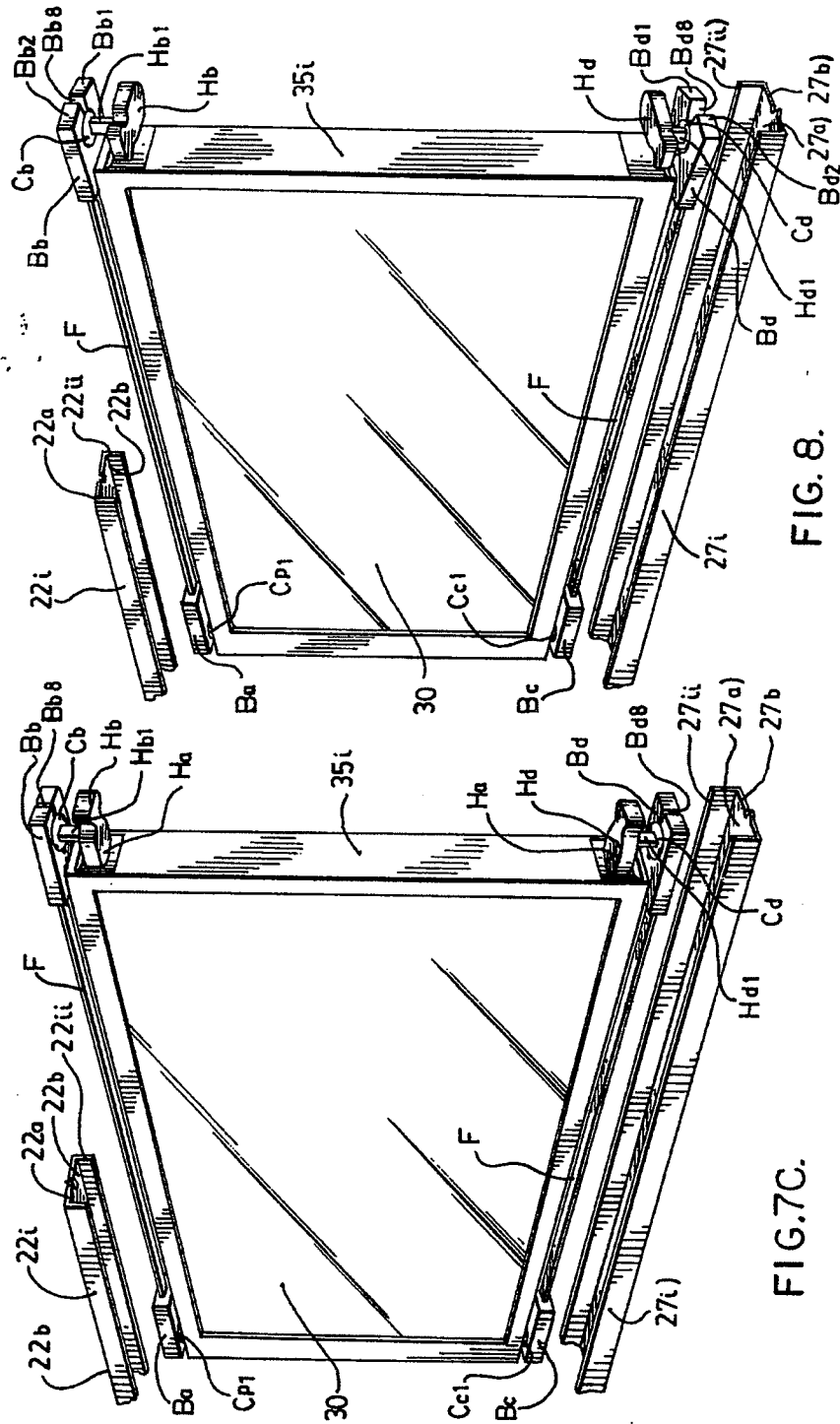


FIG. 7C.

എഫ്. ഐ.

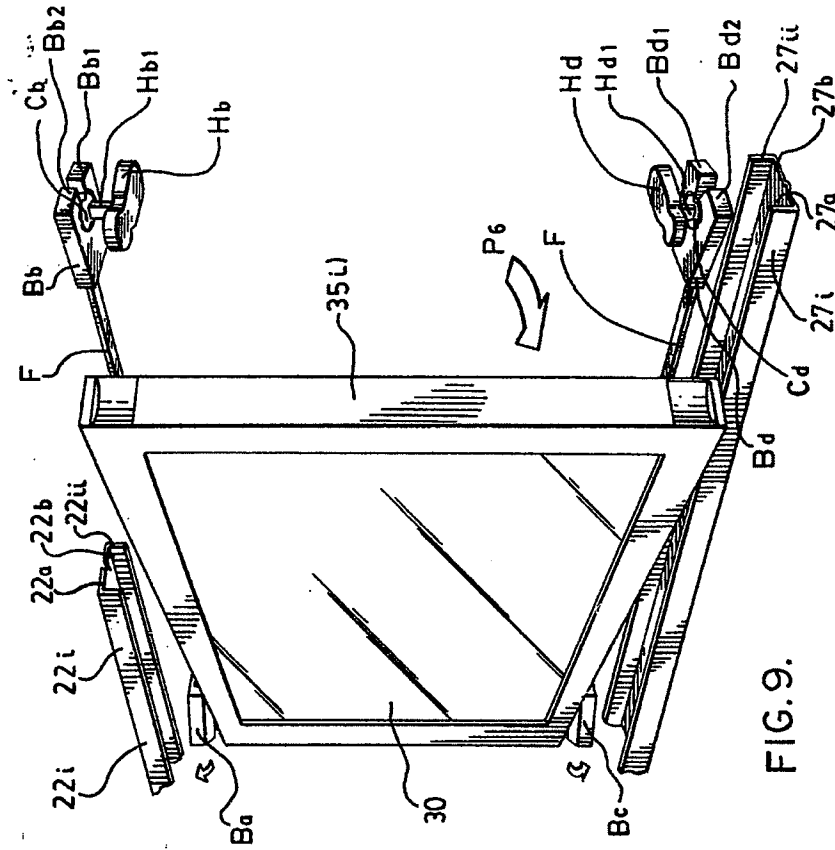


FIG. 9.

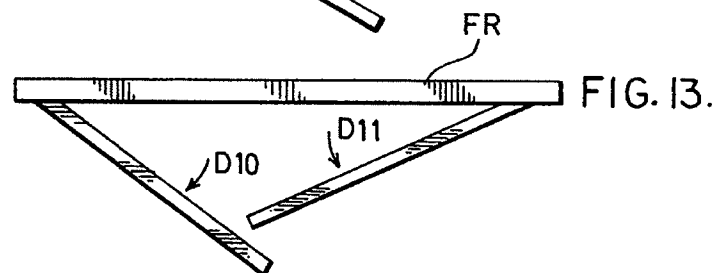
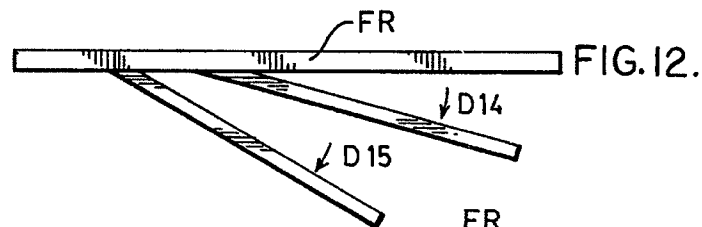
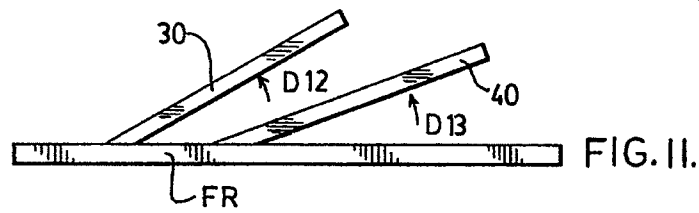
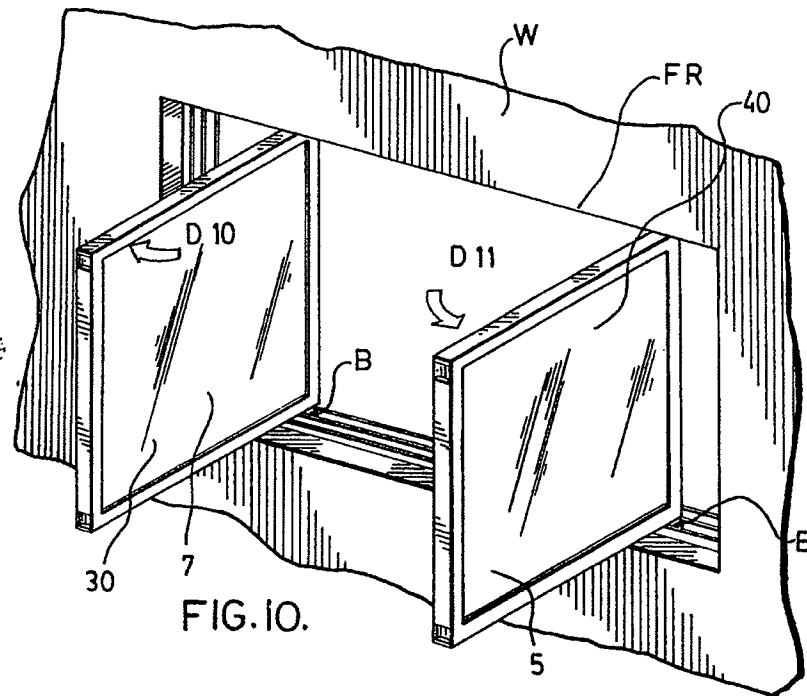


FIG. 14

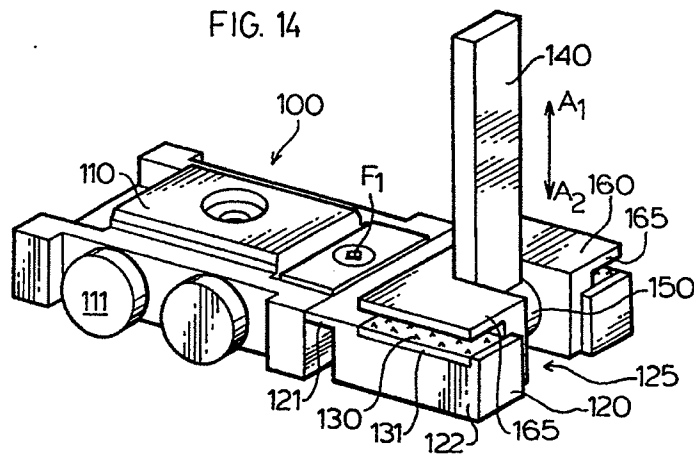


FIG. 15

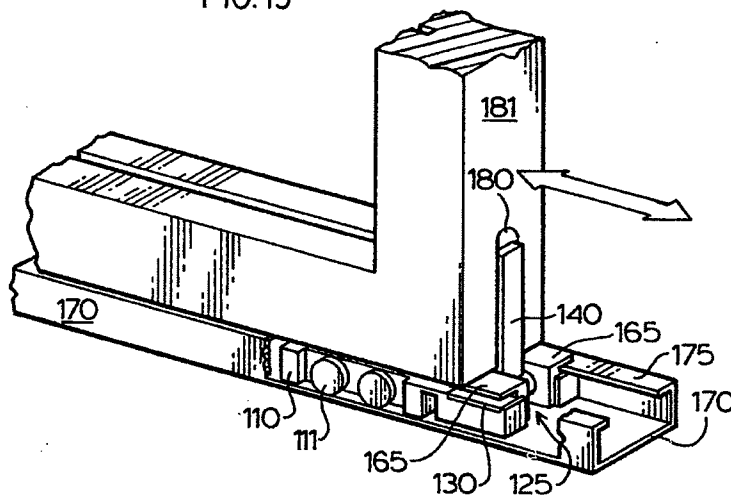


FIG. 16

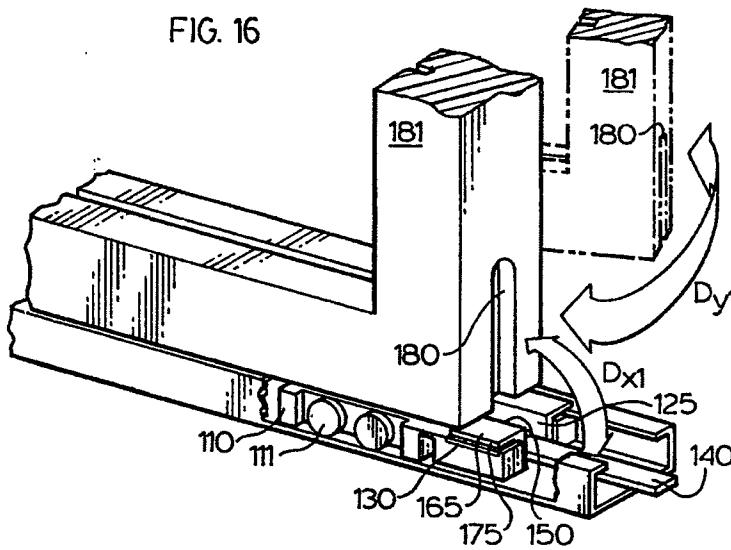


FIG. 17

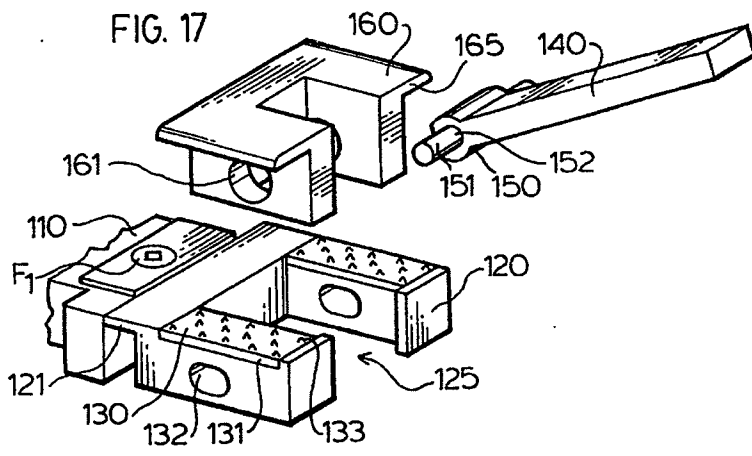


FIG. 18

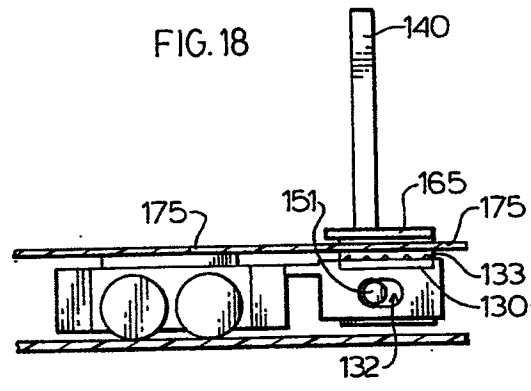


FIG. 19

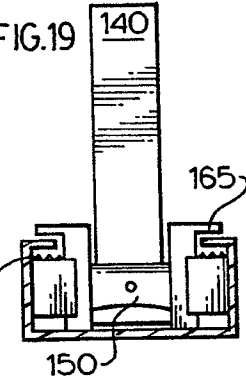


FIG. 20

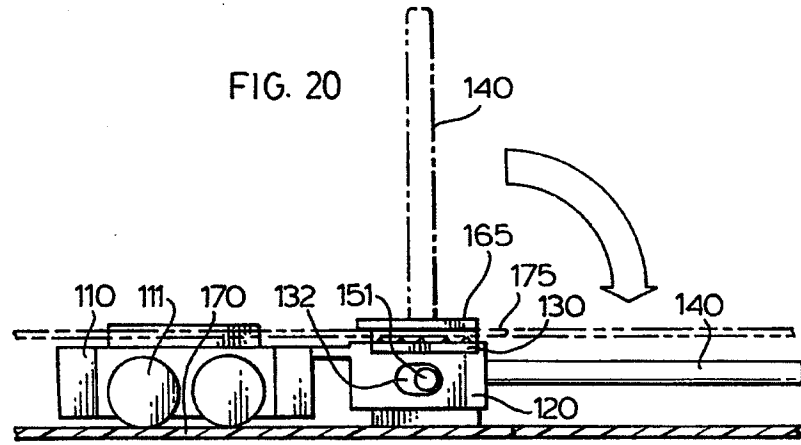


FIG. 21

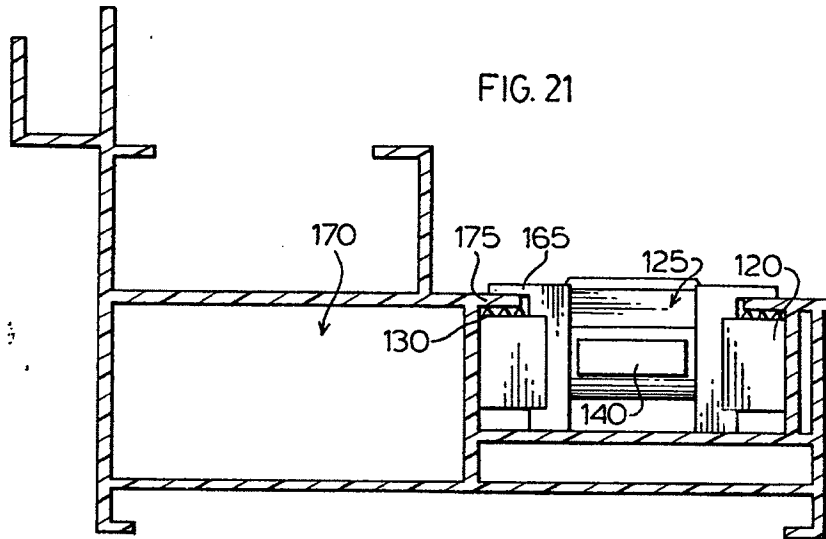


FIG. 22

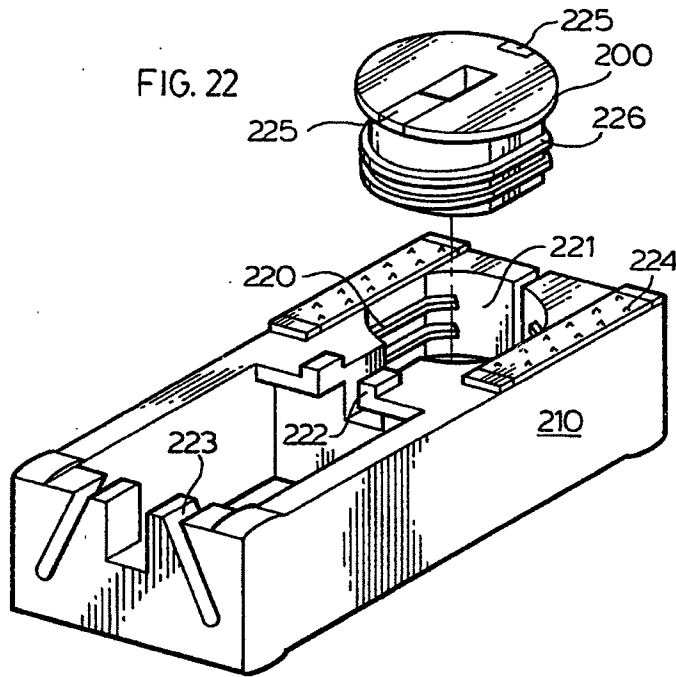


FIG. 22A

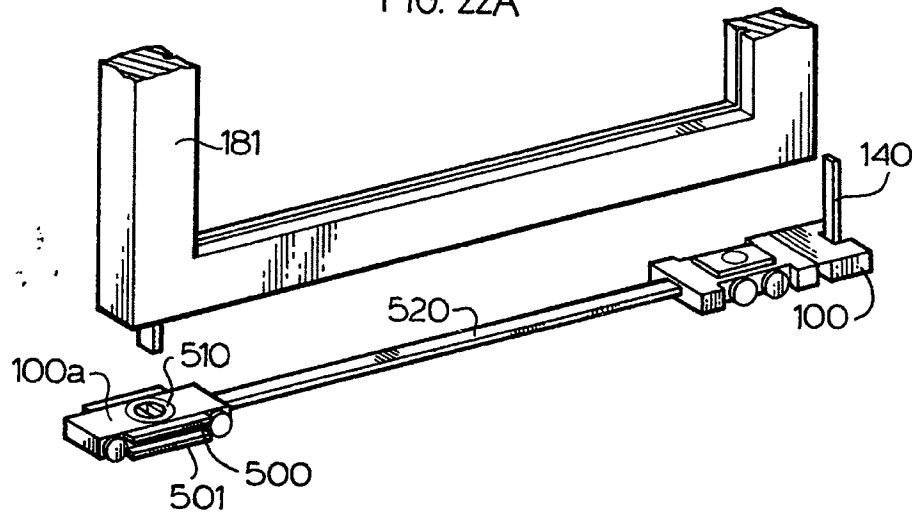


FIG. 22B

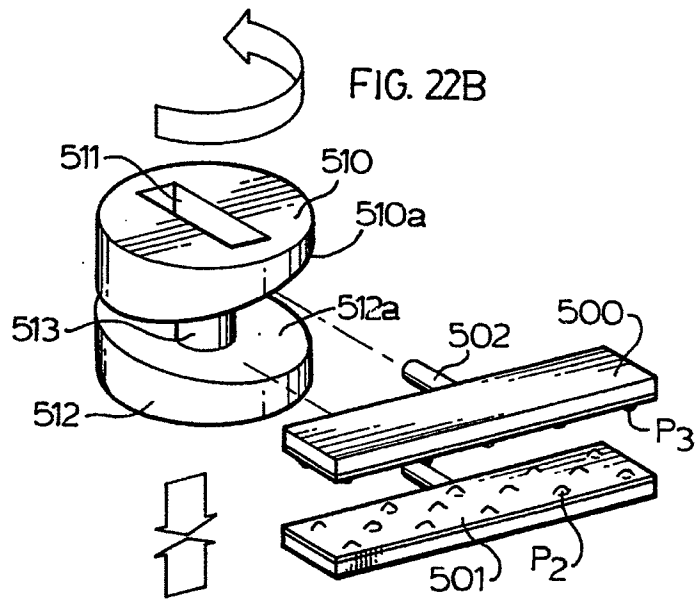


FIG. 23A

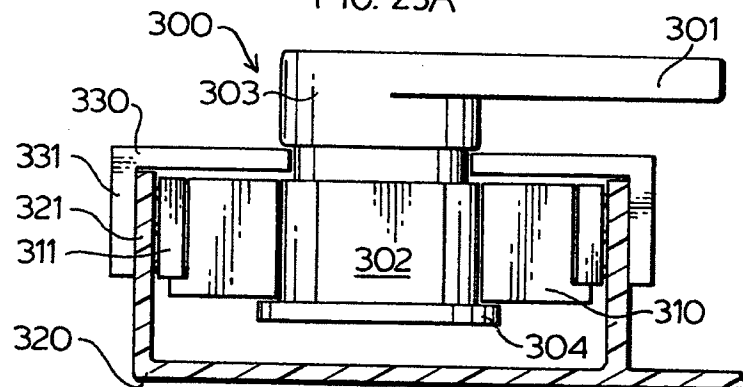
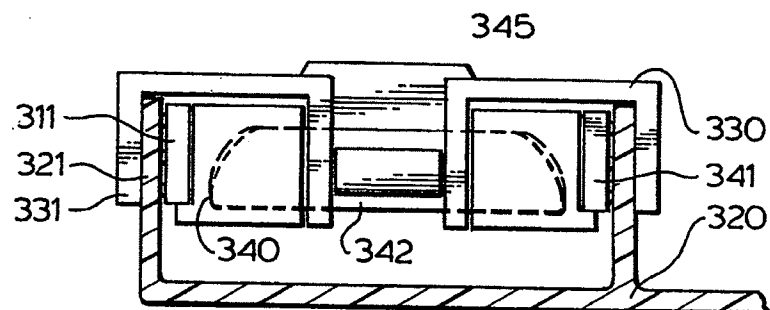


FIG. 23B



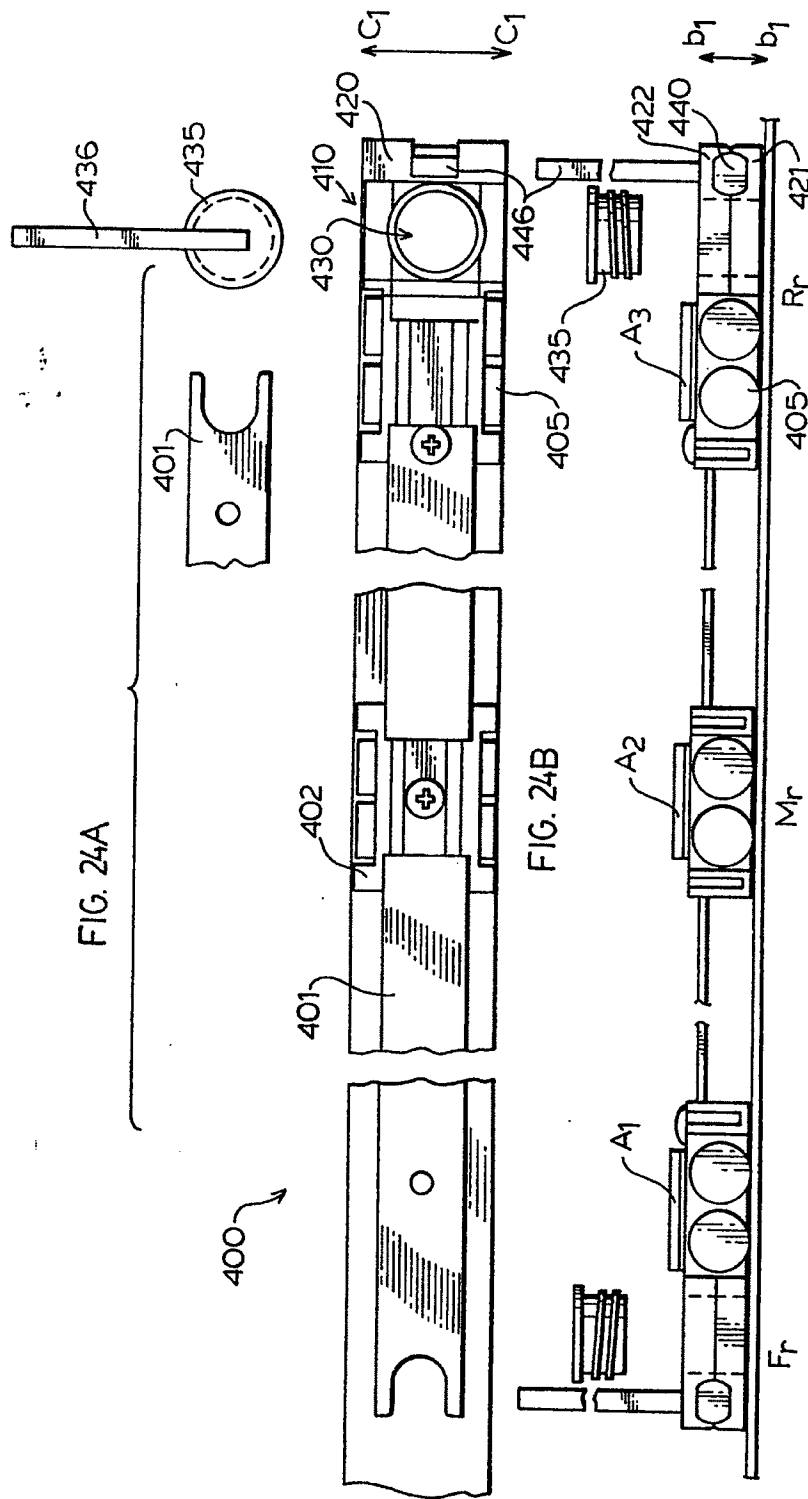


FIG. 26

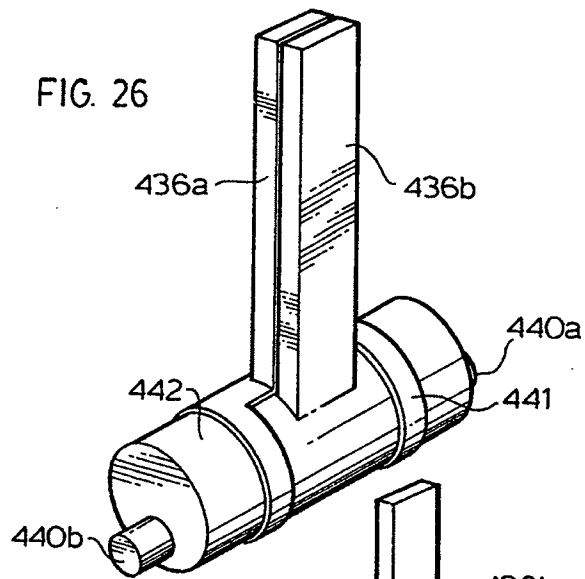


FIG. 27

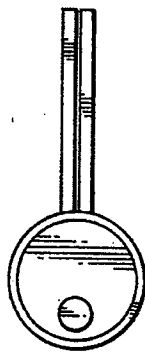
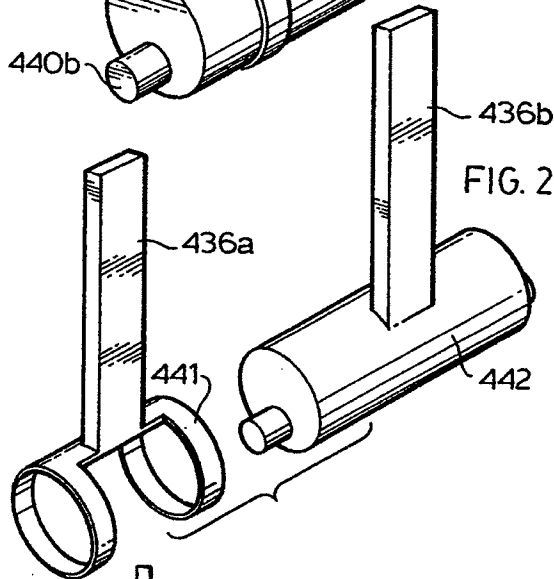


FIG. 28

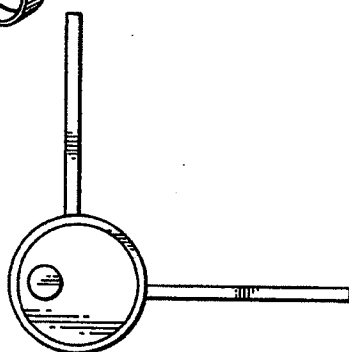


FIG. 29

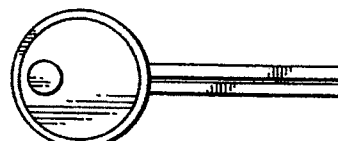
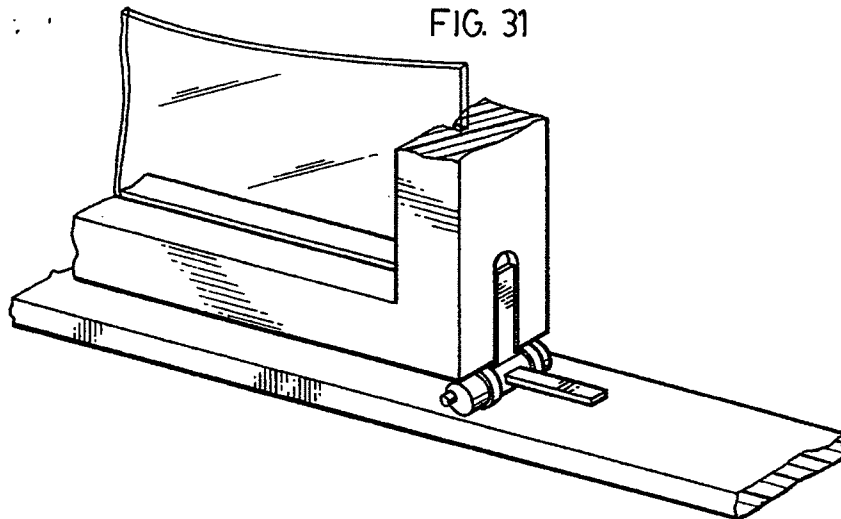


FIG. 30

FIG. 31



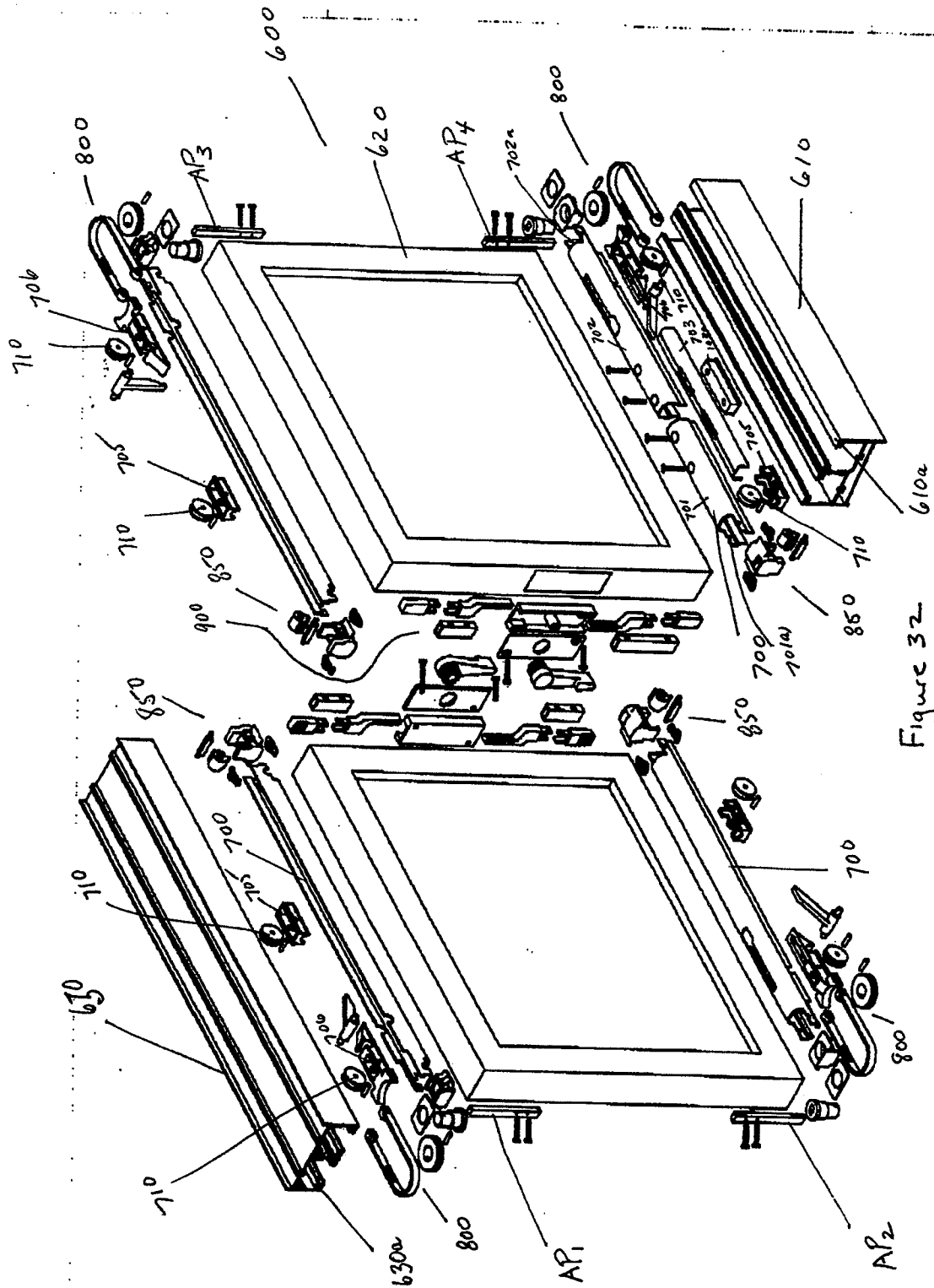
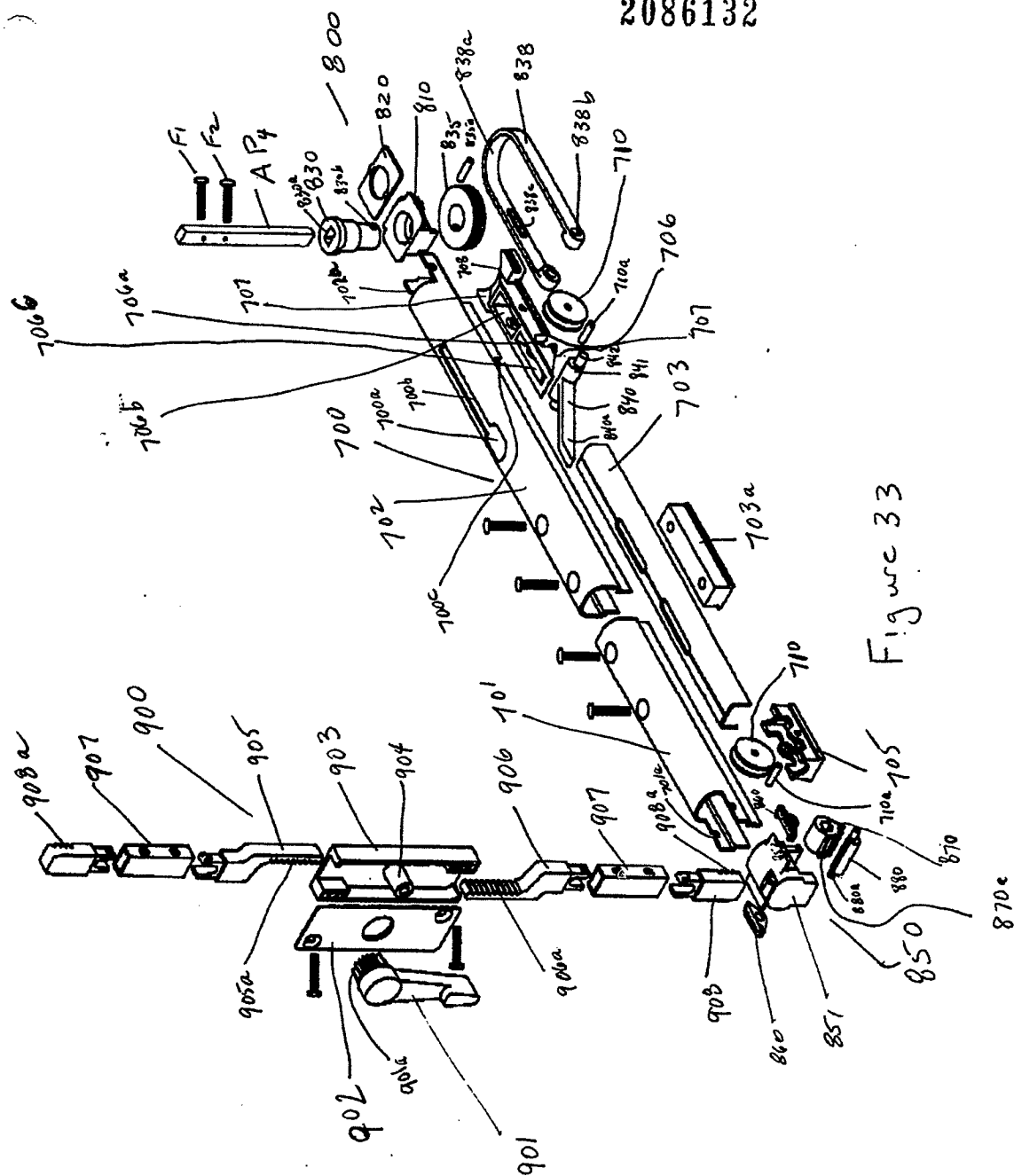
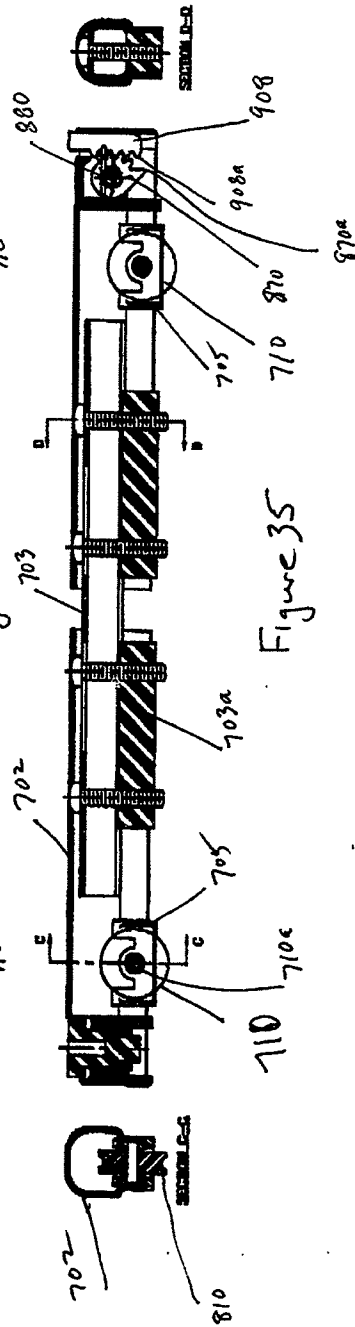
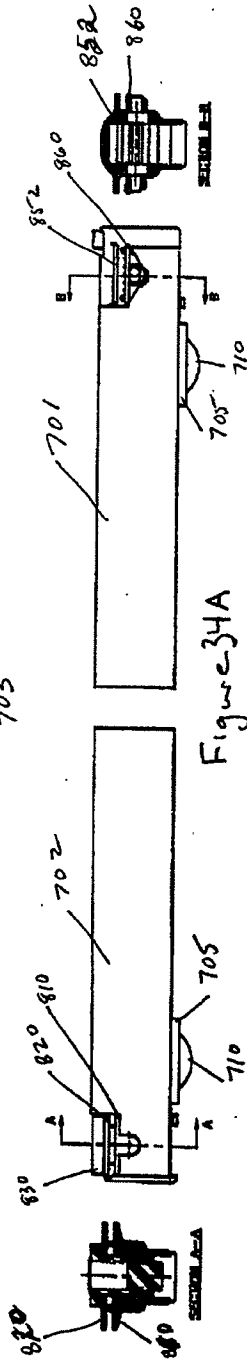
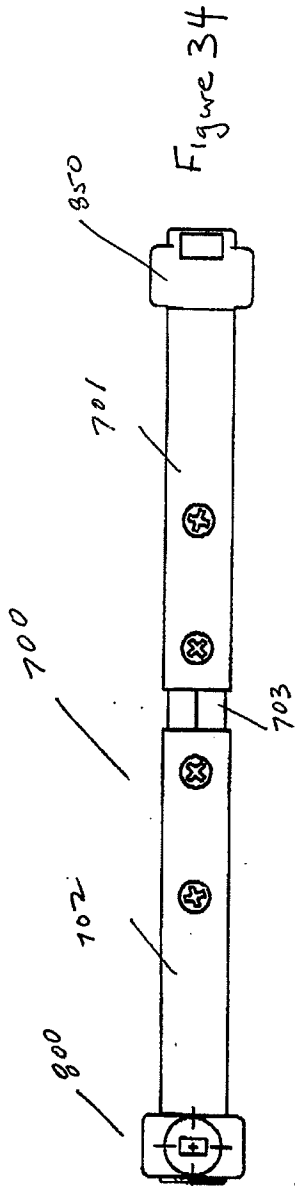
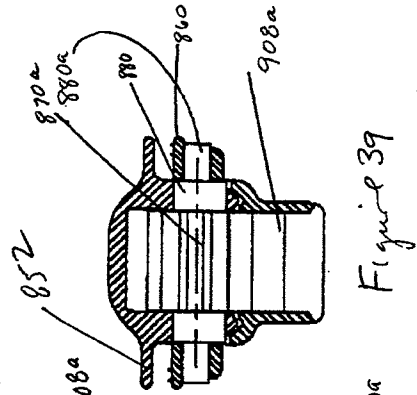
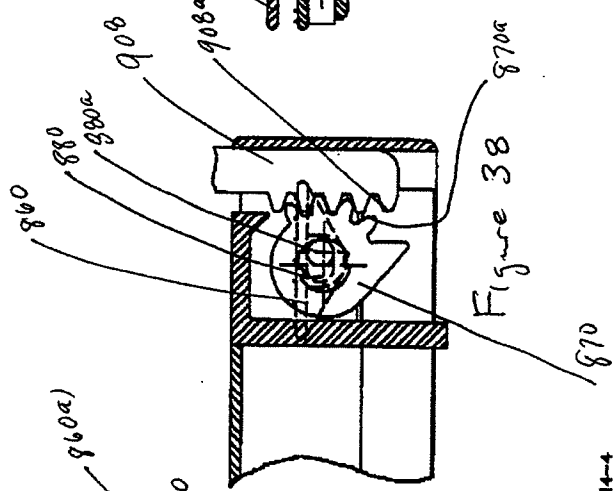
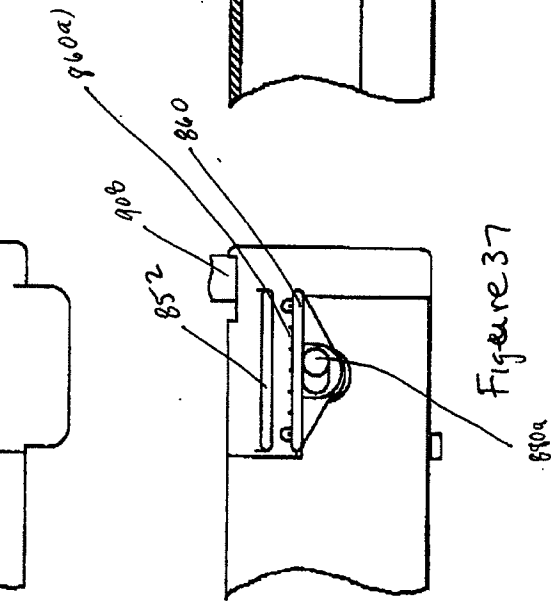
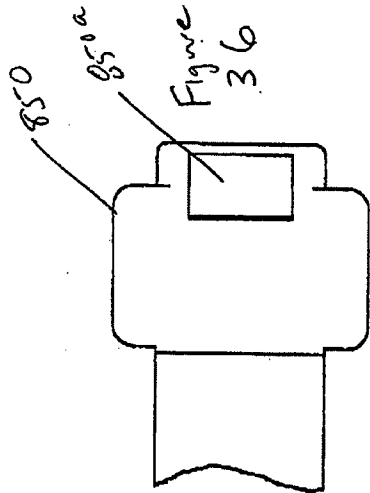


Figure 32







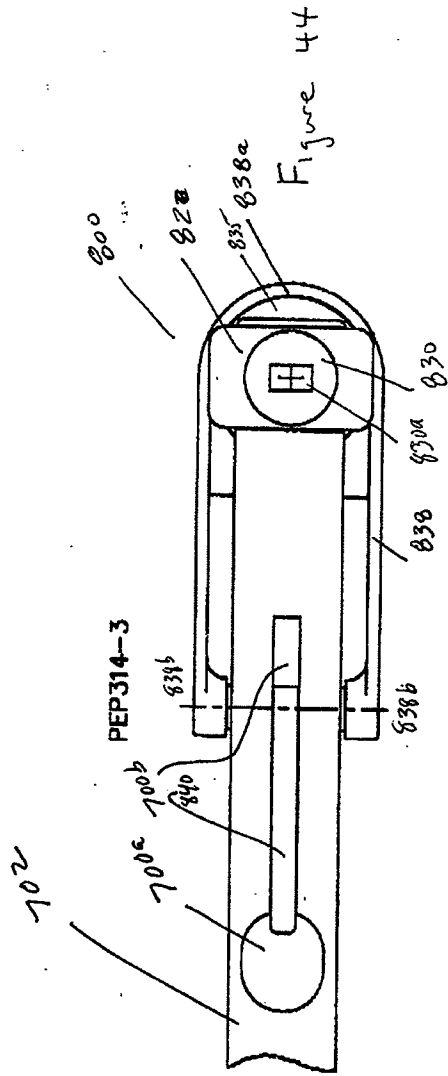


Figure 45

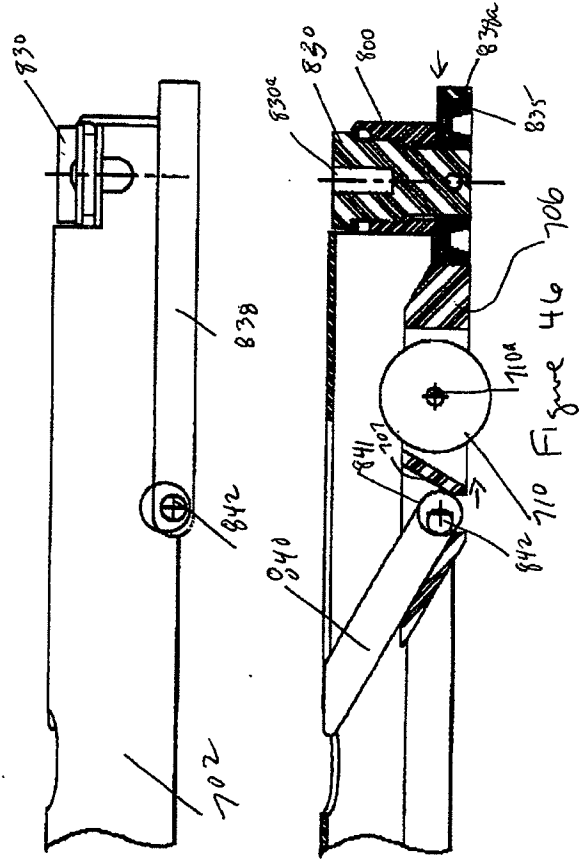
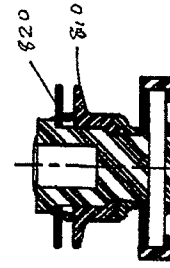


Figure 47



THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE AS FOLLOWS:

1. A closure assembly comprising a carrier portion, having two ends, which carrier portion bears a pivotable and slideable closure member, the closure member and the carrier portion being slidable in a track within the closure assembly, and the closure member being pivotable away from the closure assembly while the carrier portion remains disposed in the track to provide support for the movement of closure member of the closure assembly, the carrier portion being a continuous three dimensional supporting member extending substantially along the length of the closure member and having means for mounting hardware means disposed proximate each end of the carrier portion, (preferably said carrier portion being of substantially uniform cross section extending between said means for mounting hardware means disposed proximate each end of said carrier portion), said means for mounting hardware means having hardware means mounted therewith to provide latching proximate the free end of the closure member and locking proximate the pivotable end of the closure member in use, the closure member being supported in the closure assembly by the carrier portion both when the closure member is pivoted away from the assembly when locking proximate the pivotable end of the closure member is activated in use, or remains slideable in the track when latching proximate the free end of the closure member is activated in use.

2. A pivoting and sliding closure assembly comprising:
an opening extending in a peripheral frame having disposed therein or attached thereto track portions,
at least one closure member having two ends and slideable within said track portions, pivotable proximate at least one end of the at least one closure member, and latchable proximate the other end of the at least one closure member, each track portion having disposed therein a carrier portion having

two ends and being a continuous three dimensional supporting member extending substantially along the length of the closure member and slideable within said track portions, and having means for mounting hardware means disposed proximate each end of the carrier portion, (preferably said carrier portion being of substantially uniform cross section extending between said means for mounting hardware means disposed proximate each end of said carrier portion),

the means for mounting hardware means of said carrier portion adjacent the pivotable end of the at least one closure member having means to lock the carrier portion from sliding movement within the track portions, wherein when the at least one closure member pivots, the means to lock the carrier portion from sliding movement in the track portions is activated,

the means for mounting hardware means of said carrier portion adjacent the latchable end of the at least one closure member having latching means for latching the at least one closure member to prevent the closure member from pivoting at the pivotable end of the closure member when the closure member remains slideable within said track,

the at least one closure member being braced from sagging by the the carrier portion disposed in each track, the carrier portion further preventing the closure member from disengaging from the carrier portion adjacent the pivotable end of the at least one closure member when the at least one closure member is rotated to an open position. In a preferred embodiment the carrier portion has rolling means disposed therewith, for assisting the movement of the closure member within the track portion. Preferably, the closure member is a window sash. In another preferred embodiment, the carrier portion is adjustable in length to allow for variety in the length of windows closure members or the like.

3. The assembly of Claim 1 or 2, wherein the carrier portion has rolling means disposed therewith for assisting the movement of the closure member with the track portion.

4. The closure member of Claim 3, wherein said closure member is a window sash.

5. The closure member of Claim 3, wherein the carrier portion is adjustable in length.

6. The assembly of Claim 2 wherein the carrier portion adjacent the latchable end of the at least one closure member further comprises means to lock the carrier portion from sliding movement within the track portions, wherein when the latching means unlatches the closure member to allow pivoting of the closure member the means to lock the carrier portion is activated.

7. A pivot assembly for use with a pivoting and sliding closure assembly disposed in an opening, the closure assembly having track portions, the closure assembly having at least one closure member slidable within said track portions and pivotable at one end of the closure member and latchable proximate the other end of the closure member,

the pivot assembly comprising a carrier portion having two ends and being a continuous three dimensional supporting member extending substantially along the length of the closure member and slideable within said track portions, and having means for mounting hardware means disposed proximate each end of the carrier portion, (preferably said carrier portion being of substantially uniform cross section extending between said means for mounting hardware means disposed proximate each end of said carrier portion),

the means for mounting hardware means of said carrier portion adjacent the pivotable end of the at least one closure member having means to

lock the carrier portion from sliding movement within the track portions, wherein when the at least one closure member pivots, the means to lock the carrier portion from sliding movement in the track portions is activated,

the means for mounting hardware means of said carrier portion adjacent the latchable end of the at least one closure member having latching means for latching the at least one closure member to prevent the closure member from pivoting at the pivotable end of the closure member when the closure member remains slideable within said track,

the at least one closure member being braced from sagging by the the carrier portion disposed in each track, the carrier portion further preventing the closure member from disengaging from the carrier portion adjacent the pivotable end of the at least one closure member when the at least one closure member is rotated to an open position.

8. The pivot assembly of Claim 7, wherein said carrier portion has rolling means disposed therewith for assisting the movement thereof.

9. A pivot assembly for use with a pivoting and sliding closure assembly having a guiding channel having outwardly extending flanges, and having a closure member slidable in said channel and pivotable therefrom, the closure member having a top and bottom, said closure member having pivot means proximate the top and bottom at one end thereof engaging a first end of two continuous three dimensional carrier portions disposed in the guiding channel proximate the top and bottom of the closure assembly, said closure member having latching means disposed at the other end of the closure member remote said pivot means proximate its top and bottom for engaging a second end of the two continuous three dimensional carrier portions,

the pivot assembly comprising the first and second carrier portions, each carrier portion supporting the closure member substantially along its length and being slidable in said guiding channel of the closure assembly and having a

top and bottom and having disposed proximate the bottom thereof at least one roller or wheel, said carrier portions having disposed proximate the ends thereof a reduction in cross-section extending from proximate the top to intermediate the bottom of said carrier portion, operating means being disposed proximate the reduction in cross-section proximate each end of each carrier portion, the pivot end of each carrier portion providing operating means including pivot means for engagement with the pivot means of said closure member in use, the free end of the carrier portion providing operating means including latch engaging portions for engagement of the latching portions of the closure member, each operating means having clamping portions for releasably locking the laterally extending flanges of the guiding channel of the closure assembly when the latching means are removed from the operating means proximate the free end of the closure member in use and when the closure member is pivoted laterally away from the closure assembly in use, the clamping portions of operating means having two members at least one of which is moveable with respect to the other from a position wherein the flange is disposed between the members but remains unclamped when the closure member remains slideable in the guiding channel in use, to a position wherein the flange is disposed between the members and is clamped when the closure member is unlatched from the carrier portion in the guiding channel proximate the free end thereof in use, wherein when the latch portions of the closure member are removed from engagement of the operating means proximate the free end of the closure member in use the members move towards one another as a result of the disengagement motion in use, the clamping means thus engaging the laterally extending flanges of the guide channel of the closure assembly thus locking the carrier portions in position in relation to the guide channel thereby allowing the secured pivoting of the closure member upon the pivot means of the carrier portion away from the guide channel of the closure assembly, the closure member when pivoted causing the operating means of the carrier portion proximate that end of the carrier portion to lock in position in the guide channel of the closure assembly in

identical manner to the operating means proximate the free end of the closure member,

the closure member being braced from sagging by the carrier portion disposed in each track, the carrier portion further preventing the closure member from disengaging from the carrier portion adjacent the pivotable end of the closure member when the closure member is rotated to an open position.

10. The assembly of claim 7 or 9 further comprising a check mechanism of a closure member pivotable window, the window comprising pivot means to allow said window to pivot from a full closed position to a fully open position, the check mechanism comprising engaging means directly moveable with said pivot means, operating means for preventing activity of the window from pivoting, binding means moveable when said operating means is moved, said binding means for binding the mount of said engaging means and said window, wherein a user may position the window in an infinite number of checked positions.

11. A carrier for a closure member of a closure assembly, said closure assembly including track portions within which the closure member slides and from which the closure member rotates, the carrier comprising an adjustable continuous three dimensional member having two ends and being moveable in said track portions, the three dimensional member having hardware mounting portions disposed proximate each end thereof, the hardware mounting portions for mounting hardware means including clamping means being disposed with said hardware means and for actuating said clamping means in one aspect when releasing the free end of the closure member and further upon the rotation of the closure member, the hardware means of said carrier having locking means disposed therewith for locking said closure member at an infinite number of rotatable positions, the locking means of said carrier being engageable with user operated latching means disposed with said carrier (preferably accessible to a user

when the closure member is rotated away from the plane of the closure assembly) and having detent means being moveable from a first position whereat said locking means is unencumbered by said detent means to a second position whereat said locking means is encumbered by said detent means and the closure member cannot rotate from its encumbered position; wherein said closure member in use is supported when the closure member slides in the track of the closure assembly or when said closure member pivots laterally away from said closure assembly and locked by the user at a desired position.

12. A check mechanism for a pivotable closure member, the closure member having pivot means to allow said closure member to pivot from a fully closed position to a fully open position, the check mechanism comprising engaging means moveable as a result of the movement of said pivot means when the closure member is pivoted, operating means accessible to a user and moveable between checked and unchecked positions, binding means moveable when said operating means is moved, said binding means for binding the movement of said engaging means and said closure member at a user defined position, wherein the binding of said engaging means prevents the movement of said closure member upon the pivot means thereof, wherein a user may position the window in an infinite number of checked positions.

13. A release mechanism for locking a closure member from pivoting movement in a closure assembly, the closure member being pivotable proximate one end thereof and lockable from pivoting movement proximate the other end thereof, said release mechanism comprising operating means disposed with the closure member, proximate the lockable end of the closure member, and user operable to and from a first locked position and a second unlocked position, bi-directional locking means moveable by the operation of said operating means to cause locking portions engaged with said bi-directional locking means to move in and out of engagement with locking detents disposed proximate at least two

opposed locations of said closure assembly, wherein the operation of the operating means in a first direction causes the locking portions to move out of engagement with the locking detents and therefore allow pivoting movement of the closure member, and wherein movement of the operating means in a second direction causes the locking portions to move into engagement with the locking detents and therefore prevent the pivoting movement of the closure member.

This application is a Continuation-In-Part of United States Patent Application Serial No. 07/677,135, filed on March 29, 1991 which is a Continuation-In-Part of United States Patent Application Serial No. 07/418,212, filed on October 6, 1989, which is a Continuation of United States Patent Application Serial No. 5 07/287,327, filed on December 21, 1988, now U.S. Patent 4,888,915, the disclosures of which, in relation to closure assemblies and the hardware mechanisms therefore, are hereby incorporated by reference into this disclosure.

TITLE OF INVENTION

10 CLOSURE ASSEMBLY AND IMPROVED LOCKING HARDWARE
THEREFORE.

FIELD OF INVENTION

This invention relates to the field of closure assemblies, wherein a closure member moves, in said closure assembly by sliding in track portions 15 provided with said closure assembly and by tilting or pivoting, laterally away from said closure assembly. Also provided for use with the closure assemblies is hardware that may be used advantageously to improve existing closure assemblies, providing for the locking, latching, and securing of the closure member within the closure assembly, as it moves to and from locked, unlocked, 20 latched, unlatched, checked, and unchecked positions. The inventions find particular application for tilt and slide window assemblies and hardware therefore.

BACKGROUND OF THE INVENTION

Double hung windows are well known in the art. There are a 25 multiplicity of examples of such double hung windows which incorporate window frames and jamb guides located therein for the sliding of a window sash within the jamb guide. Further there are many examples within the prior art which allow for the sliding of a window sash within a frame within the jamb channels thereof which further incorporate a carrier or shoe attached to the 30 window sash which allows for the pivoting of the window sash away from the window frame.

U.S. Patent 4,610,108 describes such a device which incorporates a generally U-shaped spring member within a block, wherein a pin or strut extending from the window sash is connected. A cam member is incorporated in the block member which is rotatably engagable with the U-shaped member to
5 lock the block in position.

Another example of such a tiltable window sash is found in U.S. Patent 3,844,066 wherein the block is further attached through the sash balance. The cam is incorporated in the block and a pin or strut is attached thereto for rotational pivoting of the window sash and the subsequent locking of the block
10 in position.

U.S. Patent 4,364,199 describes a similar type block as described above incorporated in a window jamb weather strip, whereby the slidable block is held fixedly in place with respect to the weather strut.

U.S. Patent 4,718,194 describes a shoe or block for pivoting a sash
15 and allowing the sliding thereof as well within the window jamb channel, wherein the window may be removed from the assembly while the lock and balance remain in place. This allows the insertion of the window when repaired without the nuisance and deterioration of the movement of the sash and block. Another example of an alternative structure which illustrates the multiplicity of
20 cams and block assemblies found within the prior art is found with U.S. Patent 4,683,676. The aforementioned reference describes a split shoe having a cam and stud or pivot assembly which allows for the ease of repair of the pivot block and portions thereof without providing for a special feature within a jamb channel of a window frame.

25 Canadian Patent 1,195,186 describes a typical shoe and sash assembly incorporating a spring member for gripping to the jamb channel when the cam is rotated. U.S. Patents 3,146,501, 3,462,882, 3,184,784 and 3,055,062 illustrate alternative cam devices used within window frames.

U.K. Patent Application 2,083,118 describes a window assembly
30 incorporating a pair of wheels within a sash frame to allow for the sash frame to

more easily slide within the jamb channel.

U.S. Patent 3,842,540 describes a two part cam and locking structure which attaches into the sash portions of the window assembly and allows for the pivoting and locking of a window assembly. However, the structure is not embodied to easily access the locking portion, being attached to the balance sash as best illustrated in the figures 6 through 9 of the aforementioned Patent. When the window sash is pivoted away from the frame the handle portion does not disengage the window sash but provides for locking portions to lock the sash in a predetermined vertical position during tilting thereof.

Further within the prior art a tilt slider is manufactured and distributed by Canadian Thermo Windows, whose office is in Toronto, Canada, which provides sash assemblies and pivots therefor for sliding in a horizontal direction. A shoe or block is provided to allow for the sliding of the windows within a channel within the header and sill sections of the window frame. Pins extend from the block or shoe into the sash at the top and bottom of each window sash. The pins, pivot or struts as they are known in the art extend into a cam member which is rotatable when the sash is rotated in a direction away from the window frame and thus allows for the locking of the window frame in position. There is further incorporated in the shoe design a fastening device to fasten the pin or strut extending into the cam into the shoe or block to prevent the pin and hence window from falling out of the cam should the sash have a tendency under its weight to load the cam pin. It has been typically a problem to the operation of the window assembly to ensure the easy movement thereof and prevent the window sash from sagging when it is moved. It has been found that in operation the window sash will not always return to the same location for locking in that the, for example, top block or shoe may be advanced in position when the window is sagged and returned from its pivoted position and thus an opening to allow air to pass through may occur at the edge of the window when closed. Further the window incorporates latching means to latch the window in position for security purposes. Further locking means are provided which

incorporate tongues which extend in a vertical position into the header and sill channels to prevent the window from pivoting and allow when unlocked to pivot the window. However such devices are typically recessed into the window sash at the edge thereof and are often difficult to operate.

5 Further within the prior art the aforementioned problems described above will generally occur when any pivot block provided on the edge of the window sash moves in relation to another pivot block. The only means for securing the sash of the window to the pivot block being either a pin or strut. The continuing motion and sliding of the windows back and forth and the
10 pivoting thereof causes the windows to misalign and sag under the weight of gravity especially when manufactured in a vertical tilt slider. In order to overcome this problem an improved bracing system is sadly lacking within the prior art.

 A multiplicity of designs for sliding patio doors further exist within
15 the prior art. A typical patio door is made up of two framed main glass panels sliding in a horizontal direction but which do not typically pivot. The weight of the patio doors would require a substantial device in order to allow for the pivoting thereof, such hardware would further eliminate or minimize the door sagging out of position and the need for realignment of the doors when pivoted
20 back to the closed position. The pivoting of patio doors would be quite attractive and would allow for the incorporation of French type doors in the industry. No such doors exist within the market place at the present time.

 It is therefore an object of this invention to overcome all of the deficiencies in the prior art stated above which allows for smooth operation of a
25 closure member which is capable of both sliding within a guide channel and tilting upon a pivot assembly thereof. Nowhere within the prior art is such a device provided which allow for the manufacture of heavier windows in larger sections without the sagging of the window and having reliable operating pivots incorporated in the block members which both allow for the pivoting and
30 locking of the window by the user.

It is a further object of the invention to provide a reliable pivot shoe for use in relation to a guide channel disposed within a frame for a closure member whereby locking of the pivot shoe occurs almost immediately when the window or closure member is rotated.

5 It is a further object of this invention to provide a pivot shoe assembly which is interconnected to allow for the bracing of the closure member and the prevention of sag thereof. Another one of the problems in the prior art especially when forming vinyl or plastic extrusion for framing portions of a closure assembly is that there may be a distortion in the extrusion because of
10 the tolerances of manufacture of the extrusion. For example, a typical extrusion has a track portion which has a height, a width and a length. One problem will occur when the overall width of the track differs along the length of the track resulting in a variation in the operation of a pivot shoe disclosed in the C.I.P. application 07/418,212 which is a continuation in part of serial no. 07/287,327
15 filed December 21, 1988 claiming priority from a Canadian Application 577,393 filed on September 14, 1988. The parent application has issued as U.S. Patent 4,888,915.

 Therefore, in constructing vinyl extrusions a pivot shoe as taught in the parent materials, clamps against the sides of the track but has a maximum
20 ability to move the locking portions. The cam when rotating has a particular offset distance and the legs of the locking portions extending towards the side of the track an equivalent amount to that offset distance. Should however the vinyl extrusion have a significant variation in width from end to end in the dimension between the walls of the track, the pivot shoe and the locking thereof
25 will work less effectively or in some instances may not work at all. For example, if the overall width of the shoe when the locking means are extended is 29.0 millimeters and the tolerance variation in the formation of the width of the extrusion is between 28.5 and 29.2 millimeters then the pivot shoe will operate loosely in some of the tracks and will not offer any braking what so ever over
30 some of the track because the variation and the tolerances of the extrusion is

outside of the ability of the pivot shoe.

Of course, the problem is discussed in relation to vinyl and plastic. This also is the case when forming an aluminium window or any structure in a window regardless of the material used as any structure will have a range of
5 tolerance in manufacture.

Another problem experienced when using plastics such as vinyl with the pivot shoe substantially as taught in US Patent 4,888,915 is the flexing of the side walls under pressure from the locking portions of the pivot shoe. The flanges of the shoe flex sufficiently to deform the plastic track away from the
10 action of the locking portions of the shoe and thus decrease the effectiveness of the braking action.

Most known closure assemblies for patio doors, sliding windows, doubled hung windows and the subject matter of U.S. Patent 4,888,915 have tracks or channels within which a pivot shoe glides. Nowhere within the prior
15 art is there found a pivot shoe which has clamping means which captures at least one flange of the track portion therebetween to provide the locking or securing functions of the pivot shoe.

It is therefore a primary object of this invention to provide a pivot shoe which includes clamping means which in use clamps at least one flange of
20 the track portion of a closure assembly to provide the braking or securing of the pivot shoe within the track.

It is a further object of this invention to provide a pivot shoe which is lockable within a track of a closure assembly and includes operating means to do so.

25 It is known within Applicant's prior teachings as cited above, to provide closure members, and preferably windows within assemblies, which both tilt and slide within the assemblies. In the prior disclosures Applicant has taught the use of interconnected carrier blocks of window assemblies, which carrier blocks include locking and clamping means, for the reasons set out in the
30 aforementioned disclosures, which are hereby incorporated by reference. The

carrier blocks of the previous disclosures provide for carrier blocks located at specific locations providing for support along the length of the closure member and at adjacent the ends thereof. Although the aforementioned disclosures provide for the bracing of a pivoted closure member in an assembly, by
5 providing a hardware assembly which remains locked in the track of a closure assembly when said closure member was pivoted, no check mechanism was provided for checking the pivoted closure member, at an infinite number of locations. Further no description was presented as to the provision for a continuous support along the length of the closure member.

10 Further, in closure assemblies, for homes in particular, the latching and unlatching for a simple pivoting closure member as is known in the art, or a tilt and slide closure member, a problem is left unresolved, in that at times a number of lock and latch operating handles must be moved for the user to facilitate the operation of the closure member. Nowhere within the prior art, to
15 the best of Applicant's knowledge, is there provided a simple release mechanism for a pivoting closure member, nor for a tilt and slide closure member, which may be used to release and lock the free end of a pivoting closure member, to allow for pivoting and to prevent pivoting of the closure member, the release mechanism including a bi-directional action which provides for secure locking
20 of the closure member, and preferably the securing thereof in a carrier portion, which provides for the various features of the tilt and slide window assembly.

It is therefore a primary object of the invention to provide a hardware assembly for tilt and slide closure members, said assembly providing for all of the secured motions of the closure member within the closure
25 assembly.

It is yet a further object of the invention to provide a closure assembly within which the aforementioned hardware may be installed.

It is yet another object of the invention to provide a check mechanism for a pivotable closure member of a closure assembly, which allows
30 for the locking of the closure member in an infinite number of operator actuated

positions in relation to the closure assembly.

It is yet still a further object of the invention to provide a carrier portion which includes clamping portions which clamp therebetween flanges or the like of a track of the closure assembly, by the action of releasable detents
5 which are removably engagable and disengagable with the flanges thereby affecting latching and locking actions when installed in a closure assembly.

Further and other object of the invention will become apparent to those skilled in the art when considering the following summary of the invention and the more detailed description of the preferred embodiments
10 illustrated herein.

SUMMARY OF THE INVENTION

According to one aspect of the invention, there is provided a pivoting and sliding closure assembly comprising:

i) an opening extending in a peripheral frame said peripheral
15 frame including a header portion, a sill portion and two vertically extending jamb portions

ii) the sill and header portions or the two jamb portions having disposed therein or attached thereto track portions extending in a substantially parallel direction to the extensions of said peripheral frame portions

20 ii) a) at least one closure member slidable within said track portions and pivotable proximate at least one end thereof and latchable proximate the other end thereof

iii) each track portions having disposed therein at least two pivot shoes being interconnected by interconnecting means, each pivot shoe including
25 a preferably substantially rectangular shaped carrier portion, the carrier preferably having rolling means disposed therein for assisting the movement of the pivot shoe, the carrier further having interconnecting portions therewith to interconnect with the interconnecting means (preferably lockable interconnecting means lockable in relation to said carrier) some of the carrier
30 portions having disposed therein an opening wherein camming means are

disposed, said camming means being moveable to cause locking means disposed with said pivot shoe to engage and lock the pivot shoe from sliding movement in the track portions

iv) some of the camming means of some of the pivot shoes
5 having engagement means therewith for engagement with pivot means of the at least one closure member to allow the at least one closure member to rotate when free to do so and upon rotation thereof to cause the camming means to rotate thus locking the locking means of the pivot shoe

v) some of the camming means of some of pivot shoes having
10 latching means engaged therewith for latching the at least one closure member having latch engaging means therewith to prevent the closure member from pivoting upon its pivot means when the closure member remains slidable with said track and which when disengaged locks the pivot shoe in position with respect to the track by engaging the locking means thereof

15 vi) the at least one closure member being braced from sagging by the interconnecting means interconnecting the pivot shoes disposed in each track, the interconnecting means further preventing the pivot means from disengaging from the relevant pivot shoe when the at least one closure member is rotated to an open position.

20 According to another aspect of the invention, there is provided a pivoting and sliding window assembly comprising:

i) an opening extending in a peripheral frame said peripheral frame including a header portion, a sill portion and two vertically extending jamb portions;

25 ii) the sill and header portions or the two jamb portions having disposed therein or attached thereto track portions extending in a substantially parallel direction to the extensions of said peripheral frame portions;

ii) a) at least one window sash slidable within said track portions and pivotable proximate at least one end thereof and latchable proximate the
30 other end thereof;

iii) each track portions having disposed therein at least two pivot shoes being interconnect by interconnecting means, each pivot shoe including a preferably substantially rectangular shaped carrier portion, the carrier preferably having rolling means disposed therein for assisting the movement of the pivot shoe, the carrier further having interconnecting portions therein to interconnect with the interconnecting means (preferably lockable interconnecting means lockable in relation to said carrier) some of the carrier portions having disposed therein an opening wherein camming means are disposed, said camming means being moveable to cause locking means disposed with said pivot shoe to engage and lock the pivot shoe from sliding movement in the track portions

iv) some of the camming means of some of the pivot shoes having engagement means therewith for engagement with pivot means of the at least one window sash to allow the at least one window sash to rotate when free to do so and upon rotation thereof to cause the camming means to rotate thus locking the locking means of the pivot shoe;

v) some of the camming means of some of pivot shoes having latching means engaged therewith for latching the window sash having latch engaging means therewith to prevent the at least one window sash from pivoting upon its pivot means when the closure member remains slidable with said track and which when disengaged locks the pivot shoe in position with respect to the track by engaging the locking means thereof;

vi) the at least one window sash being braced from sagging by the interconnecting means interconnecting the pivot shoes disposed in each track, the interconnecting means further preventing the pivot means from disengaging from the relevant pivot shoe when the window sash is rotated to an open position.

According to yet another aspect of the invention there is provided for use in a pivoting and sliding closure assembly, a closure member (preferably a window sash) slidable within a guiding channel having outwardly extending flanges and pivotable therefrom, the closure member having a substantially

rectangular frame having a top and bottom, and having engaged at its top and bottom proximate one end pivot means for engaging a first and second pivot shoe, and having disposed proximate the other end thereof proximate the top and bottom means for engaging a third and fourth pivot shoe,

5 said pivot shoes slidable in said guiding channel and comprising a body having a top and bottom (preferably made from thermoplastic material) and having disposed proximate the bottom thereof at least one roller or wheel, said pivot shoes having disposed proximate one end thereof fastening means to fasten at least the first and third, and the second and fourth pivot shoes together
10 by connecting means extending therebetween (preferably the connecting means being adjustable in length), each pivot shoe having a slot disposed proximate the end thereof remote the fastening means, said slot including an opening therein for a cam member, said slot and opening extending from proximate the top to proximate the bottom of said pivot shoe, said cam member being substantially
15 cylindrical having a central axis and having camming means thereupon or upon the perimeter of the opening of said slot wherein a detent extends with said cam for engagement with the pivot means connected to the closure member for the first and second pivot shoe and a handle member for the third and fourth pivot shoe, said handle member having engagement means thereupon for
20 engagement with the means for engaging the third and fourth pivot shoe of the closure member, the body having two legs, one on each side of the slot, having a clamping surface upon the surface of the body adjacent the outwardly extending flanges of the guide channel;

 whereby when the handle member of the third and fourth pivot
25 shoes are rotated the pivot means and the cam member rotate, and the two legs of the body move laterally away from the cam member urged by the camming means, the clamping surface thus engages the outwardly extending flanges of the guide channel thus locking the third and fourth pivot shoes in position in relation to said first and second pivot shoes, however rotation of the handle
30 member disengages the means for engaging the third and fourth pivot shoes and

the closure member, allowing the pivoting of the closure member upon the first and second pivot shoes upon the pivot means away from the guide channel, the closure member when pivoted causes the cam member of the first and second pivot shoe to rotate wherein the first and second pivot shoes are locked in
5 position in the guide channel in identical manner to the third and fourth pivot shoe further prevented from movement under the weight of the closure member by the third and fourth pivot shoes locked and interconnected to the first and second pivot shoes.

According to yet another aspect of the invention the assembly may
10 comprise third and fourth pivot blocks whose handles extend in a substantially horizontal direction from the extension of the vertical extending pivot pins when the guide channel in which the first and third pivot shoe and the guide channel in which the second and fourth pivot shoes are vertically displaced a predetermined amount to allow pivoting of the window.

15 According to yet another aspect of the invention the closure member and the preferable window sash may further comprise weather stripping portions extending from the top and bottom thereof.

According to yet another aspect of the invention the cam member having further comprise locking means to lock the pivot pins within cam
20 opening.

According to yet another aspect of the invention the cam member may further comprise recesses upon the surface thereof in alignment with beads upon the perimeter of the opening of the slot of the rectangular body, whereby the recesses and beads when aligned allow sliding movement of the shoe,
25 wherein when not aligned cause the legs to move and cause the locking surfaces to engage the flanges of the guide channel.

According to yet another aspect of the invention the closure assembly may comprise patio doors.

According to still yet another aspect of the invention the handles
30 may further comprise keyed locking means.

According to yet another aspect of the invention a pivot shoe for connection to a pivotable and slidable closure member (preferably a window sash) is provided for movement in a guiding channel having outwardly extending flanges, the pivot shoe comprising a body having a top and bottom and two ends (preferably formed from thermoplastic materials), said body having disposed at one end thereof an opening being generally cylindrical in shape, the body having disposed upon the perimeter of the opening at least one bead (preferably laterally opposed) extending towards the center of the opening, the opening having a cam member disposed therein engagable with the closure member and having disposed upon its perimeter at least one recess (preferably laterally opposed) compatibly shaped with and for engagement with the at least one bead of the opening, the cam for engaging clamping means disposed with said pivot shoe for clamping against the outwardly extending flanges of the guide channel when at least one recess of the cam moves from a position wherein it is aligned with the at least one bead of the body disposed proximate said opening, to a position wherein it is not aligned with said bead.

According to yet another aspect of the invention the pivot shoe may further comprise roller means to improve the sliding movement thereof in the guiding channel.

According to yet another aspect of the invention each pivot shoe may further comprise fastening means to fasten more than one pivot shoes together. Preferably each body having an opening on the top thereof remote the cam for accepting a screw fastener. Preferably the fastening means being adjustable.

According to yet another aspect of the invention the roller means may further comprise at least one roller having a central axis and having mounting pins extending from the ends thereof preferably for insertion within an opening within said body proximate the bottom thereof, the opening for said mounting pins being tapered from bottom to top wherein the narrowed portion is of less width than the diameter of the mounting pins, the narrow taper having

an arcuate portion above it to retain the mounting pins in position in use.

According to yet another aspect of the invention the pivot shoe may further comprise clamping means extending wherein the clamping means are two legs of the body proximate the opening created by a slot extending from
5 proximate the top to proximate the bottom of the body and substantially bisecting the openings, each leg by movable into clamping engagement with the outwardly extending flanges of the guiding channel when the cam is pivoted.

According to a further aspect of the invention the assembly may comprise a carrier wherein the locking means of the pivot shoe further
10 comprises braking surfaces affixed to the pivot shoe to engage the track portions of the closure assembly. In a preferred embodiment the braking surfaces further comprises preferably metal inserts having pebbled surfaces.

In yet another aspect of the invention there is provided for a closure assembly a pivot shoe having an opening therewith moveable in track portions
15 of the closure assembly, the pivot shoe having camming means disposed in the opening, locking means disposed with the pivot shoe for engagement with track portion of the closure assembly, the locking means having braking surfaces therewith to engage the track portions of the closure assembly. In a preferred embodiment the braking surfaces further comprises inserts affixed to the pivot
20 shoe. Preferably the inserts have a pebbled preferably metallic surface.

In another embodiment the pivot shoe includes a recess disposed proximate the side thereof within which the insert including the braking surfaces is disposed. Preferably the recess includes means to orient the braking surface to the surface of the track it will engage when the locking means of the
25 brake shoe is operated to engage the track. In a preferred embodiment the brake surfaces are disposed upon the surface of a braking element disposed in the recess of the brake shoe. Preferably the braking element is substantially L shaped in cross section and includes a first and second portion. Preferably the first portion includes the brake surfaces, and the second portion includes engaging portions to
30 engage the recess of the shoe, the recess having disposed therein means

(preferably a slot) to allow the braking element to float in the recess and remain oriented substantially parallel to the track portion to be engaged when the locking means of the shoe are operated to engage the track.

According to one aspect of the invention there is provided for use
5 in a track having at least one engaging portion therewith, the track being part of a closure assembly, a pivot shoe for movement in the track of the closure assembly, the pivot shoe comprising a carrier portion for movement within the track, preferably the carrier portion having disposed proximate the bottom thereof rolling means for assisting the motion of the shoe within the track of the
10 closure assembly in use, the shoe having disposed therewith clamping means to clamp in use at least one engaging portion of the track of the closure assembly, the clamping means being in engagement with operating means moveable from a position wherein the clamping means engage the at least one engaging portion of the track wherein the closure member of the closure assembly is locked or
15 secured in position, to a position wherein the clamping means disengages the at least one engaging portion of the track wherein the closure member of the closure assembly is free to move in the track.

In a preferred embodiment the shoe includes an opening within which a handle portion moves, the handle portion having a cam portion
20 disposed at one end and a lever portion disposed at the other end, the opening having disposed therewith the cam portion of the handle portion and a first clamping portion, the carrier having a second clamping surface disposed therewith (preferably the second clamping surface including a brake pad having a preferably pebbled braking surface for engagement with the at least one portion
25 of the track), the first clamping portion being moveable with respect to the second clamping surface of the carrier portion by the operation of the handle portion which engages with the first clamping portion proximate the cam portion thereof to clamp the at least one portion of the track against the at least a second surface, the handle portion including the lever portion engaging with the
30 a sash retainer disposed with the closure member when the the shoe is

disengaged from the track, wherein the operating means is moveable from a position wherein the first clamping portion and the second clamping portion engage the at least one portion of the track of the closure assembly whereat the operating means is moved to its locking position, the cam means thereof having
5 moved the first clamping portion to engage with the at least one portion of the track of the closure assembly clamped between the first clamping portion and the second clamping surface, whereat the sash retainer of the closure member is disengaged from the lever portion of the handle portion whereat the closure member is free to move away from the track of the closure assembly to a position
10 wherein the handle portion moves the first clamping portion away from the at least detent of the track and the second clamping surface by the motion of the cam portion of the handle portion, whereat the lever portion of the handle portion is engaged with the sash retainer of the closure member wherein the closure member is in engagement with the carrier portion and can slide in the
15 track of the closure member of the closure assembly upon the pivot shoe.

In essence the shoe described in the previous paragraph although different in structure, is similar in operation to the shoe illustrated in figure 6C and 6D of the U.S. Patent 4,888,915 wherein when the closure member is engaged by the detent of the locking member it will move only within the track of the
20 closure assembly. When the locking member is released from the detent portion of the closure member and the closure member is free to move away from the track then the portions engaging the track lock against the side portions of the track. Of course there is no reference to clamping portions clamping a portion of the track therebetween.

25 In a preferred embodiment a track of a closure assembly is provided the track having at least a first engaging portion disposed therewith preferably being a flange, the at least a first engaging portion riding between clamping portion of the shoe, the shoe including an operating portion having a cam portion at one end and a lever portion at the other, the operating portion being
30 moveable from a position wherein the lever portion engages the sash retainer of

the closure assembly (similar to that which is described in relations to Figures 6C and 6D of my patent) to a position wherein the sash retainer of the closure assembly is disengaged but the clamping surfaces clamp the at least at first engaging portion of the track, preferably at least a first flange, to prevent the motion of the shoe with respect to the track.

In one preferred embodiment the shoe of the instant invention is inter-connected with a second shoe by inter-connecting means, the second shoe including portions to allow the movement of the window away from the track of the closure assembly, wherein when the closure member is moved away from the track assembly such motion will cause clamping surfaces disposed with the second shoe to clamp the at least at first engaging portion of the track therebetween and securing the position of the shoe in the track of the closure assembly while the closure member is moving away from the closure assembly.

According to yet another aspect of the invention there is provided for use in a closure assembly having a track disposed therewith within which a closure member is moveable, a pivot shoe comprising a first and second clamping portion containing at least a first engaging portion of the track therebetween in use and for engaging the at least a first engaging portion therebetween in the lock position and disengaging the engaging portion therebetween yet maintaining the position of the engaging portion therebetween in use, the shoe including operating means for providing the motion of at least one of the clamping means with respect to the other clamping means and the at least at first engaging portion of the track, the operating means being operable from a first position wherein the clamping means clamp the at least a first engaging portion of the track to a second position wherein the clamping means disengages the at least a first engaging portion of the track of the closure assembly in use. Preferably the at least a first engaging portion of the track may comprise flanges preferably extending substantially laterally away from the sides of the track towards one another. In a preferred embodiment the clamping surfaces retain the laterally extending flanges therebetween and move

2086132

thereupon with the sliding of the closure member within the track of closure assembly. In another embodiment the clamping portions clamp the laterally extending flanges top and bottom thereof to capture the flanges therebetween in the lock position and to retain the flange therebetween in the disengaged position. In yet another embodiment at least one of the clamping portions has
5 disposed therewith a brake pad, preferably metal, which engages the bottom of the laterally extending flanges.

According to one aspect of the invention there is provided for use with a closure assembly a shoe, the closure assembly having a closure member
10 and a peripheral frame having disposed therewith a track or rail within which the closure member is moveably secured in use from an initial position wherein the closure member extends substantially parallel to the frame to a position wherein the closure member is disposed at an angle to the frame, the track or rail having at least a first engaging portion and at least a second engaging portion, the
15 shoe comprising at least a third detent and at least a fourth detent to engage the at least a first engaging portion and at least a second engaging portion of the track or rail, the at least a third detent for engagement with with the at least a first engaging portion of the track or rail when the closure member is disposed in the initial position to secure the shoe and the closure assembly thereat, the at least a
20 fourth detent for engagement with the at least a second engaging portion of the track or rail when the closure member is moved past a predetermined angle towards a fully open position, the track or rail with the at least a first engaging portion and at least a second engaging portion being removably engagable with the at least a third detent and the at least a fourth detent of the shoe by the
25 operation of first and second operating means respectively, the first and second operating means disposed with the shoe and moveable from a position wherein the detent portions of the shoe engage the engaging portions of the track or rail to a position wherein the detent portions disengage the track or rail portions, whereby when the closure member is in the first position the first operating
30 means is operated to engage the at least a third detent of the shoe with the at least

a first engaging portion of the track or rail thus securing the shoe and the closure member in the track or rail, whereat when the first operating means is operated to disengage the at least a third detent of the shoe with the at least a first engaging portion of the track or rail the closure member is free to move, whereat when
5 the closure member is moved past the predetermined angle towards a fully open position the second operating means of the shoe is operated at the predetermined angle to engage the at least a fourth detent of the shoe with the at least a second engaging portion of the track thus securing the shoe and the closure member in the track or rail, whereat when closure member is moved
10 towards the initial position and past the predetermined angle, the at least a fourth detent of the shoe disengages the at least a second engaging portion of the track or rail, whereat the closure member is moved to the initial position to be secured thereat when the first operating means is operated to engage the at least a third detent of the shoe with the at least a first engaging portion of the track or
15 rail.

According to yet another aspect of the invention the shoe may further comprise a pivot shoe carried in the track or rail of the closure assembly wherein the at least a first engaging portion and the at least a second engaging portion are surfaces of the track or rail and wherein the at least a third detent
20 and the at least a fourth detent of the shoe are portions of the shoe each portion having at least a surface disposed proximate the surfaces of the track or rail. In a preferred embodiment the first and second operating means of the shoe are first and second cam members which engage the portions of the shoe having at least a surface disposed proximate the surfaces of the track or rail. Preferably the first
25 cam member of the shoe has a handle engaged therewith, the handle to move the first cam member to engage the portions of the shoe having the at least a surface disposed proximate the surfaces of the track or rail and to move the at least a surface into locking engagement therewith. Preferably the second cam member of the shoe has a pivot means (preferably an opening for receiving the
30 pin of the closure member) disposed therewith for engagement with pivot

means (preferably a pin of the closure member engaged therewith), the pivot means of the closure assembly and the shoe to move the second cam member to engage the portions of the shoe having the at least a surface disposed proximate the surfaces of the track or rail and to move the at least a surface into locking engagement therewith.

According to yet another aspect of the invention the pivot shoe may further comprise first and second operating means comprising one integral means operable in two modes to effect the engagement of the shoe with the track or rail of the closure assembly.

According to yet another aspect of the invention the pivot shoe may further comprise detent portions which engage first and third engaging portions of the track or channel which are first and second surfaces. In a preferred embodiment the third engaging portions are flanges which extend substantially laterally toward one another disposed proximate the top of a generally U shaped channel. Preferably the pivot shoe further comprises second and fourth detents which engage the flanges and the surfaces.

According to yet another aspect of the invention the pivot shoe may further comprise second and fourth detents which are upper and lower detents, one disposed above the other and having opposite facing surfaces, the surfaces being moveable with respect to one another and which clamp down or alternatively upward against the first and third engaging portions of the track which are preferably flanges.

According to one aspect of the invention there is provided a carrier for a closure member of a closure assembly, said closure assembly including track portions within which the closure member slides and from which the closure member rotates, the carrier comprising an adjustable continuous three dimensional member having two ends and being moveable in said track portions, the three dimensional member having hardware mounting portions disposed proximate each end thereof, the hardware mounting portions for

mounting hardware means including clamping means being disposed with said hardware means and for actuating said clamping means in one aspect when releasing the free end of the closure member and further upon the rotation of the closure member, the hardware means of said carrier having locking means
5 disposed therewith for locking said closure member at an infinite number of rotatable positions, the locking means of said carrier being engagable with user operated latching means disposed with said carrier (preferably accessible to a user when the closure member is rotated away from the plane of the closure assembly) and having detent means being moveable from a first position
10 whereat said locking means is unencumbered by said detent means to a second position whereat said locking means is encumbered by said detent means and the closure member cannot rotate from its encumbered position; wherein said closure member in use is supported when the closure member slides in the track of the closure assembly or when said closure member pivots laterally away from
15 said closure assembly and locked by the user at a desired position.

According to yet another aspect of the invention there is provided a check mechanism for a pivotable closure member, the closure member having pivot means to allow said closure member to pivot from a fully closed position to a fully open position, the check mechanism comprising engaging means
20 moveable as a result of the movement of said pivot means when the closure member is pivoted, operating means accessible to a user and moveable between checked and unchecked positions, binding means moveable when said operating means is moved, said binding means for binding the movement of said engaging means and said closure member at a user defined position, wherein the binding
25 of said engaging means prevents the movement of said closure member upon the pivot means thereof, wherein a user may position the window in an infinite number of checked positions.

According to yet another aspect of the invention there is provided a release mechanism for locking a closure member from pivoting movement in a
30 closure assembly, the closure member being pivotable proximate one end thereof

and lockable from pivoting movement proximate the other end thereof, said release mechanism comprising operating means disposed with the closure member, proximate the lockable end of the closure member, and user operable to and from a first locked position and a second unlocked position, bi-directional
5 locking means moveable by the operation of said operating means to cause locking portions engaged with said bi-directional locking means to move in and out of engagement with locking detents disposed proximate at least two opposed locations of said closure assembly, wherein the operation of the operating means in a first direction causes the locking portions to move out of engagement with
10 the locking detents and therefore allow pivoting movement of the closure member, and wherein movement of the operating means in a second direction causes the locking portions to move into engagement with the locking detents and therefore prevent the pivoting movement of the closure member.

According to yet another aspect of the invention there is provided a
15 closure assembly comprising a carrier portion, having two ends, which carrier portion bears a pivotable and slideable closure member, the closure member and the carrier portion being slidable in a track within the closure assembly, and the closure member being pivotable away from the closure assembly while the carrier portion remains disposed in the track to provide support for the
20 movement of closure member of the closure assembly, the carrier portion being a continuous three dimensional supporting member extending substantially along the length of the closure member and having means for mounting hardware means disposed proximate each end of the carrier portion, (preferably said carrier portion being of substantially uniform cross section extending
25 between said means for mounting hardware means disposed proximate each end of said carrier portion), said means for mounting hardware means having hardware means mounted therewith to provide latching proximate the free end of the closure member and locking proximate the pivotable end of the closure member in use, the closure member being supported in the closure assembly by
30 the carrier portion both when the closure member is pivoted away from the

assembly when locking proximate the pivotable end of the closure member is activated in use, or remains slideable in the track when latching proximate the free end of the closure member is activated in use.

According to another aspect of the invention there is provided a
5 pivoting and sliding closure assembly comprising:

an opening extending in a peripheral frame having disposed therein or attached thereto track portions,

at least one closure member having two ends and slideable within said track portions, pivotable proximate at least one end of the at least one
10 closure member, and latchable proximate the other end of the at least one closure member, each track portion having disposed therein a carrier portion having two ends and being a continuous three dimensional supporting member extending substantially along the length of the closure member and slideable within said track portions, and having means for mounting hardware means
15 disposed proximate each end of the carrier portion, (preferably said carrier portion being of substantially uniform cross section extending between said means for mounting hardware means disposed proximate each end of said carrier portion),

the means for mounting hardware means of said carrier portion
20 adjacent the pivotable end of the at least one closure member having means to lock the carrier portion from sliding movement within the track portions, wherein when the at least one closure member pivots, the means to lock the carrier portion from sliding movement in the track portions is activated,

the means for mounting hardware means of said carrier portion
25 adjacent the latchable end of the at least one closure member having latching means for latching the at least one closure member to prevent the closure member from pivoting at the pivotable end of the closure member when the closure member remains slideable within said track,

the at least one closure member being braced from sagging by the
30 the carrier portion disposed in each track, the carrier portion further preventing

the closure member from disengaging from the carrier portion adjacent the pivotable end of the at least one closure member when the at least one closure member is rotated to an open position. In a preferred embodiment the carrier portion has rolling means disposed therewith, for assisting the movement of the closure member within the track portion. Preferably, the closure member is a window sash. In another preferred embodiment, the carrier portion is adjustable in length to allow for variety in the length of windows closure members or the like.

In yet another embodiment of the invention, the carrier portion adjacent the latchable end of the at least one closure member, further comprises means to lock the carrier portion from sliding movement within the track portions, wherein when the latching means unlatches the closure member to allow pivoting of the closure member the means to lock the carrier portion is activated.

According to yet another aspect of the invention there is provided a pivot assembly for use with a pivoting and sliding closure assembly disposed in an opening, the closure assembly having track portions, the closure assembly having at least one closure member slidable within said track portions and pivotable at one end of the closure member and latchable proximate the other end of the closure member,

the pivot assembly comprising a carrier portion having two ends and being a continuous three dimensional supporting member extending substantially along the length of the closure member and slideable within said track portions, and having means for mounting hardware means disposed proximate each end of the carrier portion, (preferably said carrier portion being of substantially uniform cross section extending between said means for mounting hardware means disposed proximate each end of said carrier portion),

the means for mounting hardware means of said carrier portion adjacent the pivotable end of the at least one closure member having means to lock the carrier portion from sliding movement within the track portions,

wherein when the at least one closure member pivots, the means to lock the carrier portion from sliding movement in the track portions is activated,

the means for mounting hardware means of said carrier portion adjacent the latchable end of the at least one closure member having latching means for latching the at least one closure member to prevent the closure member from pivoting at the pivotable end of the closure member when the closure member remains slideable within said track,

the at least one closure member being braced from sagging by the the carrier portion disposed in each track, the carrier portion further preventing the closure member from disengaging from the carrier portion adjacent the pivotable end of the at least one closure member when the at least one closure member is rotated to an open position. Preferably said carrier portion has rolling means disposed therewith for assisting the movement thereof.

According to yet another aspect of the invention there is provided a pivot assembly for use with a pivoting and sliding closure assembly having a guiding channel having outwardly extending flanges, and having a closure member slidable in said channel and pivotable therefrom, the closure member having a top and bottom, said closure member having pivot means proximate the top and bottom at one end thereof engaging a first end of two continuous three dimensional carrier portions disposed in the guiding channel proximate the top and bottom of the closure assembly, said closure member having latching means disposed at the other end of the closure member remote said pivot means proximate its top and bottom for engaging a second end of the two continuous three dimensional carrier portions,

the pivot assembly comprising the first and second carrier portions, each carrier portion supporting the closure member substantially along its length and being slidable in said guiding channel of the closure assembly and having a top and bottom and having disposed proximate the bottom thereof at least one roller or wheel, said carrier portions having disposed proximate the ends thereof a reduction in cross-section extending from proximate the top to intermediate

the bottom of said carrier portion, operating means being disposed proximate the reduction in cross-section proximate each end of each carrier portion, the pivot end of each carrier portion providing operating means including pivot means for engagement with the pivot means of said closure member in use, the free end of the carrier portion providing operating means including latch engaging portions for engagement of the latching portions of the closure member, each operating means having clamping portions for releasable locking the laterally extending flanges of the guiding channel of the closure assembly when the latching means are removed from the operating means proximate the free end of the closure member in use and when the closure member is pivoted laterally away from the closure assembly in use, the clamping portions of operating means having two members at least one of which is moveable with respect to the other from a position wherein the flange is disposed between the members but remains unclamped when the closure member remains slideable in the guiding channel in use, to a position wherein the flange is disposed between the members and is clamped when the closure member is unlatched from the carrier portion in the guiding channel proximate the free end thereof in use, wherein when the latch portions of the closure member are removed from engagement of the operating means proximate the free end of the closure member in use the members move towards one another as a result of the disengagement motion in use, the clamping means thus engaging the laterally extending flanges of the guide channel of the closure assembly thus locking the carrier portions in position in relation to the guide channel thereby allowing the secured pivoting of the closure member upon the pivot means of the carrier portion away from the guide channel of the closure assembly, the closure member when pivoted causing the operating means of the carrier portion proximate that end of the carrier portion to lock in position in the guide channel of the closure assembly in identical manner to the operating means proximate the free end of the closure member,

the closure member being braced from sagging by the carrier portion

disposed in each track, the carrier portion further preventing the closure member from disengaging from the carrier portion adjacent the pivotable end of the closure member when the closure member is rotated to an open position.

In a preferred embodiment the pivot assembly may
5 further comprising a check mechanism for a pivotable closure member, the closure member having pivot means to allow said closure member to pivot from a fully closed position to a fully open position, the check mechanism comprising engaging means moveable as a result of the movement of said pivot means
10 when the closure member is pivoted, operating means accessible to a user and moveable between checked and unchecked positions, binding means moveable when said operating means is moved, said binding means for binding the movement of said engaging means and said closure member at a user defined position, wherein the binding of said engaging means prevents the movement
15 of said closure member upon the pivot means thereof, wherein a user may position the window in an infinite number of checked positions.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be illustrated with respect to the following drawings illustrating embodiments of the invention in which:

The invention will now be illustrated with respect to the following drawings
20 illustrating embodiments of the invention in which:

Figure 1 is a perspective view of a tilt sliding window assembly illustrated in a preferred embodiment of the invention.

Figure 2 is a similar view to that of Figure 1, illustrating the movement of the sash of the window assembly in a preferred embodiment of the
25 invention.

Figure 3 is a perspective view of a double hung window assembly illustrated in an alternative embodiment of the invention.

Figure 4 is a view similar to that of Figure 3, illustrating the movement of the sash portion of the window assembly in an alternative
30 embodiment of the invention.

Figure 5A is a perspective view of a carrier mechanism of a preferred embodiment of the invention illustrating the components thereof.

Figure 6E is a perspective bottom view of the carrier mechanism of Figure 5A in a preferred embodiment of the invention.

5 Figure 6F and 6G are a schematic view of the carrier mechanism of Figure 6E, illustrating the operation thereof in a preferred embodiment of the invention.

 Figure 6H and 6I are a schematic top view of the blocks as illustrated in Figures 6F and 6G incorporating a handle portion in another preferred
10 embodiment of the invention.

 Figure 6J is a perspective view of a brake pad assembly illustrated in a preferred embodiment of the invention.

 Figures 6K,L,and M are close-up views of the brake assembly of figure 5A.

15 Figure 7a is a exploded perspective view of the sash 30 of Figure 1 illustrating the operating components thereof in a preferred embodiment of the invention.

 Figure 7b is a close-up cut away end view of the carrier Bd illustrated in a preferred embodiment of the invention.

20 Figures 7c, 8 and 9 are partly exploded perspective views of the sash 30 of Figure 7a illustrated in a sequence of events for sliding and tilting of the window in a preferred embodiment of the invention.

 Figure 10 is a perspective view of the window assembly of Figure 1 as shown in a fully opened position in a preferred embodiment of the invention.

25 Figures 11, 12 and 13 are top schematic views of the layout of alternatively pivoting window sashes embodied within the window assembly of Figure 1 in alternative embodiments of the invention.

 Figure 14 is a perspective view of a brake shoe incorporating clamping portions illustrated in a preferred embodiment of the invention.

30 Figures 15 and 16 are partial perspective views cut away in part to

illustrate the incorporation of the pivot shoe of figure 14 therein illustrated in a preferred embodiment of the invention.

Figure 17 is an exploded perspective view of the pivot shoe of figure 14 illustrating the interrelationship of the parts thereof.

5 Figure 18 is a close-up schematic view of the shoe installed in a window assembly of figure 15 and 16.

Figure 19 is an end view of figure 18.

Figures 20 and 21 are identical views to figure 18 and 19 with the exception in the position of handle 140 shown in the locked position .

10 Figure 22 is an exploded view of a cam installed in a pivot shoe for a double hung window assembly illustrating the clamping portions illustrated in a preferred embodiment of the invention.

Figure 22A and B are a schematic views of a pivot shoe and components thereof including clamping portions for use with a pivot of a closure assembly similar to figure 7A illustrated in an alternative embodiment of the invention.

Figures 23A and B are cutaway elevation views of alternative embodiments of the invention incorporating clamping portions.

20 Figures 24A ,24B and 25 are schematic views of track portions of a closure assembly in which pivot shoes incorporating alternative embodiments of the invention are illustrated.

Figures 26 through 31 are schematic views of an alternative embodiment of the invention.

25 Figure 32 is an exploded perspective view of a window assembly similar to Figure 2 and illustrating the hardware thereof, illustrated in a preferred embodiment of the invention.

Figure 33 is an exploded perspective view of the hardware Figure 32, used for carrying the window assembly and for latching and unlatching the window assembly, illustrated in the various components and the inter-relationships thereof, and illustrated in a preferred embodiment of the

30

invention.

Figure 34 is a top view of the of the hardware assembly of Figure 32.

Figure 34A is a side view of Figure 34.

Figure 35 is a cross-sectional view of Figure 34A.

5 Figure 36 is a close up top view of the ends of the carrier of the Figure 34.

Figures 37 and 38 are top and partially cutaway side elevation views of the ends of a carrier portion illustrated in a preferred embodiment of the invention.

10 Figures 9 and 10 are views of the mounting apparatus for the roller of the carrier mechanism shown in close-up side elevation illustrating that section only in a preferred embodiment of the invention.

Figure 39 is a cross-sectional end view of the carrier mechanism through the pinion of Figure 38 and illustrated in a preferred embodiment of the
15 invention.

Figures 40, 41, 42 and 43 illustrate a releasable latching mechanism for the free end of a window assembly of Figure 33, and illustrated in a preferred embodiment of the invention in top, side cross-sectional and side partial cut away views.

20 Figures 44, 45, 46 and 47 illustrate the locking mechanism of Figure 32 in order to describe in more detail, the operation thereof, and illustrated in preferred embodiments of the invention in top, side, partially cutaway side and end views in order to describe the operation thereof.

25 DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

Referring now to Figure 1, there is illustrated a wall W1 having an opening therein within which a window assembly 10 is contained. The window assembly 10 is made up of a peripheral frame 20 having a header portion 22 and a sill portion 27 interconnected by vertical stiles 25. Disposed upon the header
30 section 22 and the footer section 27 are track or channel portions 27a and 22a not

shown. Window sash elements 30 and 40 are slidably received within the track portions 27a and 22a respectively. The sash elements 30 and 40 slide in directions D1 and D2 respectively from open to closed positions as is known in the art. However, at the corners of each window assembly, as best illustrated in relation to Figure 7a are disposed carrier mechanisms, such as By found in Figure 1 which offer unique features which allow the window to both slide in the directions D1 and D2 and to pivot in a direction laterally away from the window frame 20.

The sash element 30 is made up of horizontally extending members 37 and 27 and vertically extending members 35i and 35ii. Window sash element 40 is comprised of horizontally extending elements 47 and 42 and vertically extending elements 45i and 45ii.

The block or carrier mechanism By has a handle disposed thereupon H1 which allow the window to be locked in position in its sliding mode the details which will be described hereinafter.

Referring now to Figure 2, there is illustrated the identical window assembly of Figure 1 with all of the components thereof, wherein the window sash 30 has moved from its position proximate the frame member 25a to a position wherein the opening 1, normally covered by a screen allows the passage of air from the outside environment. The handle H1 has been rotated as illustrated in relation to Figure 6F and 6G to allow for the pivoting of a sash 30 in a direction P1 to allow for the cleaning of the window pane 7 on both side thereof. A window normally has a tendency to sag when held in the position illustrated in Figure 2, however, because of a unique bracing system, as illustrated in Figure 7a the window remains firmly locked and supported in the position illustrated in Figure 2. The details of such mechanism will be described hereinafter.

Referring now to Figures 3 and 4, there is illustrated a double hung tilting window assembly, wherein sash elements 2 and 3 are supported on a track T1 extending in a generally vertical direction for sliding of the sashes 2 and 3 therein. For purposes of illustration, all track elements extending vertically are

entitled T1. The window sashes 2 and 3 can move in directions D4 and D3, within a multiplicity T1, two each for each window, extending substantially vertically. Each stile 2 and 3 are composed of sections S1, S2, S3, S4, S5, S6, S7, and S8 respectively as is known in the art. However, a block Bx as best illustrated
5 in relation to Figure 6F and 6G is provided to allow the pivoting of the window sash 3 in a direction P2 allow the cleaning thereof while ensuring the firm support of the window and the placement of the block Bx within guide channel S40 disposed within member S4. Further illustrated in Figure 4 are track portions T2 disposed in a general horizontal direction as is known in the art.
10 The block Bx may be conveniently attached to the sash balance of a double hung window in order to ensure the operation of the mechanism. As illustrated in Figure 7a the block or carrier Bx would be connected to the pivoting member or carrier at the end of the sash 3, wherein horizontally extending portions S2 are disposed. Thus, although the window is pivoted to a position laterally away
15 from its normal sliding position, it is fully supported by a unique structure held within the tracts T1 and locked therein which will be described hereinafter.

Thus, we see that the instant invention has application to sliding windows whether it be the sliding assembly illustrated in Figure 1 or the sliding assembly illustrated in Figure 2. The advantages of the invention may still be
20 realized in either embodiment.

Referring now to Figure 5A and Figure 6E, there is illustrated in perspective and bottom perspective views respectively a typical carrier mechanism of the block of a preferred embodiment of the invention. A thermoplastic guide member B is moulded or formed from thermoplastic
25 materials having a top and bottom and two ends, having disposed at one end thereof at the top thereof the fastening element B for interconnecting flat rod F via a notch or recess F1 which will engage with a threaded opening B6 upon a cut out section B11 on the top of the block or carrier B. Of course it is understood that at the other end of the flat rod F, exists another block or carrier mechanism
30 which is clearly illustrated in Figure 7a. The notch F1 may merely be a hole in

another embodiment. Located at the other end of the block B extending from top to bottom of a carrier mechanism is a cam portion C having cut out portions C1 disposed on each side thereof facing the track engaging portions B3 and B4 of the block B. Within the cam C is further disposed an opening of generally rectangular shape C2, within which a pin or pivot will extend in order to support the pivoting of the window frame or sash the details of which will be described hereinafter. Located adjacent the recesses C1 of cam C are disposed horizontally extending beads B9 and B10 which extend inwardly towards the center of the cam and extending in a direction of the width of the block B. A slot B8 is located within the block B extending from top to bottom which essentially bisects the opening (not illustrated) within which the cam C rides. The slot B8, thus bisects the front portion of the block B into two legs, B1 and B2 remote the flat bar F. Extending upwardly away from the block B are shoulders B100 and B200 which extend along the length of the block mechanism B and further provide the slot or recess into which the flat bar F will engage. An opening B7 is disposed upon the bottom of the carrier B and the intersection of the opening proximate the top provides for a slot proximate the fastening opening B6 within which the flat bar F is connected. Disposed within the opening is a roller R being supported by extension portions of generally tubular form R1 and R2 which fit within slots S1 and S2 formed upon the bottom of the block B proximate the sidewalls B3 and B4. The opening B7 is formed with peripheral walls A and B and having a top C which is defined as the bottom of a portion B5. The roller is provided for improving the movement of the block within a track or guide channel of a jamb, sill or header.

As is illustrated in relation to Figures 6F through 6I, the cam C may contain a pivot pin connected to either a window sash or a handle. The details of the operation of the carrier or block B will now be described in relation to Figures 6F through 6I.

Referring now to Figures 6F through 6I, there is illustrated in schematic form the operation of a block B or carrier B located within a track T

having lateral sidewalls Tx and Ty extending in a direction from top to bottom of the block B. For simplification purposes the main portions of the block B are illustrated, wherein a roller R is supported within openings formed in the carrier mechanism, as illustrated in relation to Figures 5A and 6E, the openings being

5 slightly smaller at the bottom thereof than the diameter of the pins or tubular extension R1 and R2 in order to ensure a firm fit and in the preferred embodiment the openings having a bevelled shaped proximate the bottom of the carrier B and extending into an arcuate shape approximate the top, thus allowing the pins to be snugly secured within the arcuate opening thus allowing rotation

10 of the roller R1 while providing for a snug fit prevented from being moved by the top bevelled portion of the opening being slightly narrower than the diameter of the pin. It is important that the roller be positioned so as to improve the sliding characteristics of the window and thus it must extend slightly below the carrier bottom. A cam C is located within the opening (not shown) bisected

15 essentially by the slot B8. The cam having recesses within the perimeter thereof at C1 within which complementary beads B9 and B10 extend when the block or carrier is free to slide within the channel or tract T and when the slot C2 containing the pin or pivot (not illustrated) is in a position wherein the slot C2 extends towards the beads B9 and B10. However, as illustrated in Figures 6G,

20 when the cam is rotated in the direction wherein the alignment of the recesses C1 and C2 of the cam C are no longer in alignment with the beads B9 and B10, then the leg portions B1 and B2 of the carrier B are forced laterally away from the slot B8 and thus engaging the sidewalls B4 and B3 against the inside surface of the track sidewalls Tx and Ty thus binding the block or carrier B from moving in

25 any direction. The blocks illustrated in Figures 6F and 6G are those blocks which allow for the pivoting of the window or sash and allow for the almost immediate locking of the windows or sash when pivoted to its final resting position, whether the pivoting be slight or great. The pivoting of course, must be greater than an angle theta as illustrated in relation to Figure 6G which is the

30 angle or number of degrees within which the beads B9 will engage with the

openings C2. It has been determined in a preferred embodiment that this angle is approximately 9° and thus in this embodiment if the window is pivoted for an angle of greater than 9° it will lock. In the past, windows have pivoted up to 26° without being locked and this has created problems for window hardware manufacturers in that the pivot pins may dislodge from the corresponding cam slots. By minimizing the amount of degrees of freedom for the pivoting of the window, the window is held in locked position for a greater amount of time with greater security. The beads B9 and B10 and the recesses C1 and C2 may be of significant size in order to cause the deflection of the legs B1 and B2 and yet of small enough size that the locking angle or degrees of freedom is kept to a minimum.

Referring now to Figures 6H and 6I, a specific advantage of the instant invention is illustrated incorporating the advantages of Figures 6F and 6G wherein a block is provided B at the end remote the pivot of the window sash, the block being interconnected as best illustrated in relation to Figure 7a with the block of the pivoting aspect. However, the block in Figure 6H and 6I when interconnected with the block of Figure 6F and 6G provides a tight and supportive bracing structure for the window sash when sliding as illustrated in Figure 6H, wherein the sash portion 35i having an arcuate end portion A1 compatible with the arcuate end portion of the handle Ha prevents the window sash from pivoting but remains in a locked position to allow for the bracing and thus the uniform sliding of the sash within the tract T. However when the handle affixed to the cam via a pin (not shown) connected to slot C2 is rotated in a direction P3, it will as illustrated in relation to Figure 6G cause the locking of the carrier B in position as the handle is rotated to the position illustrated in Figure 6I while unlocking the window as the arcuate surfaces A1 and Ha are disjoined. The window sash 30 will then be free to rotate in a direction P4 and will be locked in position upon its pivot as illustrated in relation to Figures 6F and 6G while the bracing block is locked in position awaiting for the movement of the sash 30 back into locking engagement with the handle portion H. The

bracing portion or block B prevent any movement of the pivot portion upon which the sash 30 is pivoting and thus prevents the dislodging of the pivot pin or the sagging of the window to any substantial extent. This is important so that the portion of the window proximate the arcuate portion A1 will not ride on the weather stripping disposed on the bottom portion of the sash 30. It has been found in the past that with other pivoting windows after a certain amount of time the weather stripping at the end remote the pivot begins to take a lot of abuse and the window begins to ride upon it. By providing a window structure which has a roller which further enhances the movement of the block and by providing a window structure which rides directly upon the blocks and not upon the weather stripping the integrity of the weather stripping is maintained for a greater period of time and the maintenance of the window is thereby reduced. This is clearly observed in relation to Figure 7b.

Referring now to Figure 7b, the aspect described above is clearly illustrated, wherein the portion of the sash 30 being supported upon a pivot pin Hd1 and upon a block Bd riding upon a roller Rd within a channel attached to the sill framing portion 27 wherein members 27i and 27ii describe a channel within which the block Bd rides. The weather stripping 37a is clearly observed as a portion of the bottom of sash member 30 which rides upon the pivot pins Hd1, for example, leaving the weather stripping in a much more reliable state not found within the prior art.

Referring now to Figure 7a, there is illustrated in exploded perspective view the window sash 30 being of generally rectangular form and having horizontally extending sections 32 and 37 and vertically extending portions 35. Disposed upon the top and bottom of sections 32 and 37 respectively are weather stripping portions 32a and 37a the use of which has already been herein described in relation to Figure 7b. A pivot pin Cp1 and Cp2 are disposed at one end of the window assembly proximate the blocks Ba and Bc respectively. These pivot pins are substantially rectangular in shape and cooperate with the openings Ca2 and Cc2 found within the cams Ca and Cc respectively. Thus the

interconnection between the sash and the pivot blocks are through the pivot pins Cp1 and Cp2. At the other end of the sash assembly and interconnected to the locks Ba and Bc are blocks Bb and Bd located at the top and bottom of the window sash respectively. The blocks Bb and Bd have pivot pins Hb1 and Hd1
5 extending into the cam openings Cb2 and Cd2 of cams Cb and Cd respectively. The handle portions Hb and Hd are connected to the pivot pins Hb1 and Hd1 respectively. The handle portions have arcuate portions Ha disposed remote the portion wherein an operator will grasp the handle.

The arcuate portions Ha extend into the arcuate portions of 35i
10 disposed within the vertical sections 35 of the sash 30. Thus the arcuate portion Ha locks the window in position for sliding purposes only and prevents the pivoting thereof when the handle Hb and Hd extend in a line parallel to the extension of the length of the blocks Bb and Bd. Interconnecting the blocks Ba and Bb are two horizontally extending flat bars F1 and F2 interconnected at a
15 fastening screw and nut V1 and V2 extending through an opening within the flat bar F2 and through a slot F6 of the flat bar F1. The slot of course, allows for the adjustability of the hardware when dealing with windows of alternative widths. It has been found that by providing standardized hardware and merely changing the distances which they are spread apart, the instant invention can apply to
20 windows from 12 inches to windows of 48 inches and beyond. When windows of 48 inches and beyond are considered it is advantageous to provide more than two blocks of the essentially same characteristics as those found within Figure 7a with the advantage that the additional blocks assist in the sliding of the window and in the bracing of the window, the blocks in the central portions being of
25 essential neutral ability not incorporating pins in one embodiment, thereby serving only as a sliding aid. For purposes of illustration, the rollers have been left out of the description in relation to Figure 7a as they were described clearly in relation to Figures 6F through 6I. The purpose of Figure 7a is to illustrate the interconnection of the blocks.

30 Blocks Bc and Bd are interconnected in similar manner to the blocks

Ba and Bb. Thus, a flat bar F3 and F4 are provided with a pin and nut arrangement V3 and V4 extending through an opening through the top of flat bar F4 and extending through a slot F5 within the flat bar F3 which again gives the adjustability of the distances between the blocks. Portions Ba11, Bb11, Bc11, and Bd11 (not shown) are provided within the blocks to allow for the interconnection of the flat bars F1, F2, F3, and F4 respectively which are fastened by a pin or alternative fasteners. It is important that the fastening be secure and the flat bar strong. Of course as is well known in the art, channels located upon the header and sill portions 22 and 27 are provided having a top and bottom 22b and 27b respectively and vertically extending sidewalls 22i, 22ii, 27i and 27ii respectively, having a surface 22a and 27a upon which the blocks will move upon the rollers.

Referring now to Figures 7c, 8 and 9 there is illustrated a sequence of events which allows for the sliding of the window within the channels as illustrated in relation to Figure 7a upon blocks Ba, Bb, Bc, and Bd respectively interconnected as illustrated in Figure 7a. Thus, when the handle Hb and Hd are in a position such that the arcuate portions Ha are securely locked within the recess or arcuate portion 35a of the vertically extending section 35 of window sash 30, the window sash 30 is only able to slide along the channels 22i and 27i while the blocks and the pivot pins remain in position such that the openings within which the pivot pins are retained (which are emphasized for the purposes of illustration in relation to Figures 7c, 8, and 9) and allow for the movement of the window sash in slidable fashion only. However, as illustrated in Figure 8, when the handles Hb and Hd are rotated in a direction such that the handles extend in a direction normal to the extension of the window, the blocks Bb and Bd will lock against the sidewalls 22i, 22ii, 27i and 27ii respectively preventing the movement of the blocks Ba and Bc in any slidable direction while the window sash 30 is free to pivot as illustrated in relation to Figure 9, thus pivoting in a direction B6 and has been clearly described in relation to Figures 6F through 6I. When the window sash 30 begins to pivot the sidewalls of the blocks

Ba and Bc will engage the sidewalls 27i, 27ii, 22i and 22ii respectively by the motion of the cam Ca, and Cc, in the direction such that the beaded portions of the carrier will cause the legs Ba1, Ba2, and Bc1, Bc2 to lock against the side rail portions preventing the movement of the window sash in a sliding direction
5 and further as described above while ensuring the location of the blocks Bb and Bd when the window is pivoted back to its sliding position. By the blocks Ba and Bb being interconnected and the blocks Bc and Bd being interconnected, by the flat bar members, a firm bracing system has been provided which prevents the movement of the end of the window wherein the pivoting occurs proximate
10 blocks Ba and Bc and prevents the pins Cp1, Cp1 from dislodging from the cam openings and further eliminates the need to anchor them in one embodiment of the invention. For safety sake to further enhance the stability of the hardware the fastener to the pin need not be eliminated but may be incorporated. However, the window will not sag, nor will the ends at which the windows
15 pivot proximate the blocks Ba and Bc have a tendency to go out of parallel with the window frame. Nor will the weather stripping take a necessary load from the window as the window will be securely held in an upright position upon the pivots braced with the forward blocks or carriers Bb and Bd.

Thus the invention has provided a window assembly in a preferred
20 embodiment which slides and pivots incorporating block mechanisms or carriers which allow for the sliding in cooperative fashion and pivoting in cooperative fashion, some of the pivots incorporating handle portions which lock the window in its sliding position and which unlock the window from its aligning position but simultaneously lock the pivoting block in position as a result by
25 locking the handle block in position. Rollers have been provided to more uniformly advance the sliding of the window sash within the tracks or channels.

It is of course understood that the alternative embodiments of the invention would incorporate other closure members such as patio doors which would operate in identical manner to that described in relation to the figures of
30 the vertical tilt slider illustrated in a preferred embodiment of the invention.

However, the hardware provided would be more substantial in material but incorporate all of the design features illustrated in the drawings. It is intended that any tiltable and sliding closure device be construed as part of the invention and the invention is thus not limited to windows alone, but has broader application than described above.

Referring now to Figure 10, there is illustrated the vertical tilt sliding window assembly of Figure 1, illustrating the sash elements 30 and 40 being slidable within the tracks disposed within a frame Fr and being pivotable upon blocks B in direction D10 and D11 respectively, wherein the window glass 7 and 5 may be cleaned on both sides and pivoted back for sliding movement within the tracks upon frame Fr. The pivoting movement illustrated in relation to directions D10, and D11 simulate that of French doors and of course have broad application in the assembly of patio doors which normally only slide within a track assembly, by improving patio doors embodied in the invention described above using the hardware described above, a firm solid pivoting assembly is provided which allow for the appearance of French doors in many designs which may enhance the beauty of patio door and vertically disposed tilt sliding windows.

Figures 11, 12, and 13 describe only three alternative pivoting directions of the window sashes 30 and 40, that described in Figure 13 being identical to that in Figure 10. Thus the windows may be swung out in directions D12 and D13 or may be swung inward in directions D14, and D15. The design of the invention is to allow the greater flexibility for window manufacturers and to allow for a standardization of inventories. It is not important as to which extrusions are used for the framing sections. Further, it is not important as to what guide channels are provided. The invention may be applied to any window design and to any sash design providing the features described herein are incorporated into the design and that the shoe or carrier is dimensioned so as to ride within the guides or channels provided within each individual window design. The flat bars may come in one piece or in sections to allow for variation

in the size of windows and it is at the present, determined that three sizes of hardware may be supplied to provide for all window sizes presently in the marketplace. However, this is not stated as a limiting aspect of the invention as any new development or unique window design may be incorporated and embodied with the unique hardware of the present invention.

In an embodiment as illustrated in Figure 5A, 6E, and 6F-M the clamping surfaces B3, B4 of Figure 6G include a braking element Bp which is generally L shaped in cross section and includes a portion Bp2 which includes the braking surfaces including pebbles P1 and a portion Bp1 which engages the recess of the shoe By1 and By2. The braking surface includes metal inserts having a generally rectangular shape and having a pebbled surface. On the face of the clamping surfaces B3, and B4 there is a cut out or opening in which these inserts may be fastened. These inserts behave as brake pads and improve the performance of the entire system by ensuring a positive braking action much the same as brake shoes of an automobile.

To ensure the positive braking action of the system and referring to figures 6k, L, and M there is provided a recess in the side of the shoe B proximate the track Ty, The recess By1 including a generally rectangular perimeter for reception of the braking element Bp. Proximate the rear of recess By1 is provided a generally arcuate portion Bx which in use contacts portion Bp1 along the edge thereof as best seen in relation to figure 6L and M. The contact is made tangentially to the braking element Bp which floats in the recess By1 to ensure the orientation thereof in relation to the surface of the track Ty being engaged. As best seen in figure 6M when a force Fc is provided from the cam the locking portion of the shoe as described in relation to figure 6G including the arcuate portion Bx engages the braking element Bp at the braking surface thereof to engage the pebbles P1 with the surface of the track Ty, The arcuate portion ensuring the orientation of the brake element Bp in a plane substantially aligned with the surface of the track being engaged.

Referring now to figures 14 through 21 there is illustrated a pivot

shoe indicated generally as 100 being generally rectangular in shape . The shoe 100 has a carrier portion 110 having rollers disposed proximate the bottom thereof. Affixed to one end of the carrier portion 110 of shoe 100 is a clamping portion 120 which is connected to the body of the carrier by a flexible thin portion 121 and a fastener F1. The clamping portion 120 includes recesses 131 which carries braking elements 130 the use of which has been described above. The use of braking element 130 is analogous to the previous description of figures 6F,G,H and I. The braking surfaces 130 are carried in the recess 131 disposed with portion 122 which is attached via the thin flexible portion 121 to allow flexing of the brake surfaces , the use of which will be described hereinafter.

A moveable clamping portion 160 is disposed within an opening 125 separating the two portions 122 carrying the braking surfaces 130. The clamping portion 160 is manufactured from glass filled nylon in order to ensure the strength thereof. Glass filled nylon finds particular application with the clamping surfaces because of the clamping surfaces improved resistance to creep under the pressures developed over nylon alone or plastic materials. The balance of the shoe may be made from less hardy materials provided the materials subjected to loads will not creep and lessen the performance of the unit. The Clamping member 160 includes clamping flanges 165 which clamp flanges 175 of track 170 between clamping element 165 and braking surface 130. In order to move the clamping member up and down so as to provide the clamping action of the flanges 175 between element 165 and element 130 , a handle portion 140 is provided which operates within the opening 125 of the clamping portion 120. Disposed at one end of the handle 140 is a cam portion 150 having an offset mounting as best seen in relation to figure 17 and being carried within openings 161 of the clamping member 160 and openings 132 of clamping element 122 by offset pins 151 . The offset pins are allowed to travel within openings 132 as a result of the cam surface 152 abutting the opening 161 of clamping portion 160 and pushing it in a vertical direction so as to move the clamping flanges 165 towards and away from the flanges 175 of track 170.

The separation between the braking surfaces 130 and the clamping flanges 165 is sufficient to allow free unrestrained motion of the shoe in the track 170 until such time as the handle 140 is moved from the position illustrated in figure 18 to a position illustrated in figure 20. In moving the handle 140 the cam 5 150 is moved as well to allow the cam surface 152 to push downward on the clamping element 160 via openings 161 and to clamp the flange 175 of the track 170 between the clamping element 165 and the braking element 130. The braking element is provided only on the bottom of the track as the use thereof tends to pit the flanges 175 which are invisible on the bottom of the flanges 175. If the 10 braking elements 130 are left out of the structure it is recommended that the braking surface 130 be formed from materials such as glass filled nylon to prevent creeping action of the surfaces under the clamping pressure.

The handle 140 has a second purpose as best seen in relation to figures 15 and 16. The closure member 181 includes a sash retainer portion 180 15 therewith to receive the handle 140 when the handle is in the position illustrated in figure 14. Therefore when the shoe 100 is not locked to the flanges 175 and the window 181 can slide in the track in the direction shown similar to the operation described in relation to figure 7A and 7B. When the handle 140 is released from the retainer 180 and generally in the position illustrated in figure 20 16 then the flanges 175 are clamped between elements 165 and 130 of the shoe 100 and the closure member is free to rotate or pivot away from track 170 in a direction Dyl.

Referring now to figures 22A and 22B there is illustrated a pivot shoe 100 as described above interconnected with a pivot shoe 100(a), 25 interconnected for the same advantages as described in relation to figure 7A etc. Provided with the shoe 100(a) is a cam portion 510 which is engaged to the pivot pin 181(a) via the opening 511. When the handle 140 is disengaged from the sash retainer 180 of closure member 181 then the window is free to pivot away from the track (not shown). In pivoting as with the structure of figures 6G and 9, the 30 cam will cause the braking elements 500 and 501 to move towards one another

thus capturing the flange 175, not shown, and securing the closure member in the track.

Cam portions 510 and 512 have oppositely oriented ramp surfaces 510(a) and 512(a) disposed therewith upon which the pins 502 ride to cause the motion of the braking elements towards and away from the flange 175, not shown. Because of the presence of brake pads including pebbled portions P2 and P3 this structure may be used with aluminum window assemblies.

Referring to figure 22 there is illustrated a pivot shoe 210 used for a double hung window assembly as illustrated in figures 3 and 4. This shoe 210 incorporates the clamping action previously described in relation to track 170 at flange 175. Of course however the structure is modified to be incorporated in a double hung window. A cam portion 200 is provided in the shoe 210 having a slot 201 disposed with the shoe to receive the pivot pin of the window. When the cam is in the position shown in figure 22 then the pin cannot be released. The cam 200 is disposed in an opening 221 in the shoe 210. The opening has disposed about it's perimeter an interrupted thread 220 which if continuous would describe a helical thread. The cam portion 200 has mating threads 226 disposed therewith to mate with the threads 220 of the shoe 210. Brake shoe elements 224 are provided for similar use as previously described. A balance slot 223 is provided with the shoe which is provided at the end of the shoe opposite the cam 200. Guides 222 allow for ease of assembly.

The cam 200 includes clamping surfaces 225 which clamp the flanges 175 between itself and braking elements 224 when the cam is rotated by the action of the window pivoting. The helical threads on the cam 226 and the shoe 220 allows for the vertical motion of the clamping surfaces 225 in relation to the braking surfaces 224 when the cam is rotated. Therefore the braking surfaces 225 are rotated in and out of orientation with the braking surfaces 224. When the braking surfaces 225 and 224 are parallel to one another then flange 175, not shown, is clamped and thus the window locked only when the window is pivoted away from the track as seen in figure 4. When the window is in the track

as shown in figure 3 , then the surfaces 225 and 224 are not oriented so as to provide clamping action, but are separated.

Referring now to figures 23A and 23B there is illustrated an alternative embodiment of the invention when the track 320 does not have flanges similar to 175 provided therewith and it is still desirable to clamp the upwardly extending flanges 321. Therefore a shoe 300 is provided which includes a cam portion 303 which is anchored in an opening 302 of the shoe 300 by rim portions 304 to retain the cam 303 in the opening 302. A handle 301 is integrally provided with the shoe similar to the handle of figure 7A at the end of the window opposite the pivot. By turning the handle in figure 23A or by pivoting the window on pin 345 of figure 23B the cam portion 300 and 340 respectively will rotate causing portions 310 and 340 to spread and cause brake pads 311 to engage the side of the track 321 braced by the clamping portion 331 to clamp between 331 and 311 the flange 321. The clamping portion 330 is made from glass filled nylon for the same reasons set out above. the portion 330 is fixed in position and does not move in relation to the assembly being fixed on the shoe by portions 346 as best seen in relation to figure 23B.

Referring now to figures 24A,B and 25 there is illustrated an alternative embodiment of the invention which provides double locking action of a pivot shoe. Therefore the structure shown will lock the shoe in position when the window is parallel to the track and also when the window is moved away from the track as described in relation to figure 6I. The structure of figure 6I is incorporated to provide a lock which engages the sides of the track when the window is pivoted and which may provide security locking of the window in any of its sliding positions except when fully closed.

Shoes A1, A2, and A3 are therefore provided which are interconnected by portion 401 for the reasons already described. Rollers 405 are provided with the shoe. Cam portions 435 are provided which operate as previously described. For example a handle 436 is provided to engage the action of the cam 435.

Referring to figure 24B a handle 446 is provided similar in construction to handle 140 of figure 17 , and having a cam 440 at one end. The handle 446 is held in a sash retainer WR when the window is free to slide. When the handle is pushed down to the locked position then the window can not slide. This is because the cam 440 causes the portions 422 and 421 to press against the top and bottom of the rail which includes portions 175 as illustrated in figure 17 . In essence therefore the operation is similar to the operation of the structures of figure 7A with the exception that the security locking is provided against the top and bottom of the track. Alternatively a more complex handle arrangement may be provided to ensure that the sash retainer is still engaged when the security lock is engaged.

Therefore as illustrated in figures 26 to 31 a double handled unit is provided for inclusion into the structures of figures 24A, 24B, and 25 and specifically in the position shown with respect to the pivot shoe A3. Two components 441 and 442 make up the cam assembly 440 which can move simultaneously or separately. If both the handle portions 436a and b are contained within the sash retainer as exemplified by figure 28 then the window is not locked. In the position of figure 29 and 31 the window cannot slide, the security lock having been engaged by motion of handle 436b while the window is retained in the sash retainer by handle 436a. In figure 30 the window is free to pivot but may lock by cam 435 as previously described.

Referring now to Figure 32, there is illustrated a window assembly much the same in functionality in relation to the windows assemblies described in Figures 1, 7(A), 10, 14, 22(A) and 24(A), with the exception that the hardware provided has some very unique differences. The window assembly 600 therefore may be installed as a tilt and slide window assembly as described in relation to the figures listed above, or as a double hung window assembly, as best seen in relation to Figures 3 and 4. Referring now to Figure 32, the window assembly 600 therefore includes two sash members 620 having hardware located proximate the top and bottom of each of the windows, so as to provide for the sliding of the

window sash 620 within the track member 630, and to allow for the pivoting of the window outwardly away from the track 630. The track portion 630 and 610 are shown in part only, since more details of the window assemblies have already been described within the descriptions of the previous Figures. The track

5 610 and 630 have inwardly extending flanges 610(a) and 630(a), which will be clamped by the hardware 800 and 850 disposed proximate each end of the carrier portions 700, in a similar manner to that which is already described in relation to Figures 14 through 31. However, the hardware provided in Figure 32 includes a carrier portion 700, made up of a first portion 701 and a second portion 702. The

10 cross-section of these portions is best seen in relation to Figure 33 and Figure 35. Each portions 701 and 702 are interconnected by a connecting portion 703 and a block portion 703(a). Therefore, the carrier portion 700 may be extended to the length required by including in other embodiments, more than one interconnecting portion 703 and block 703(a).

15 Disposed proximate the end of each carrier portions 701 and 702 are hardware mounting cut outs 701(a) and 702(a) which provide for the mounting of hardware assemblies 800 and 850 proximate the ends of the carrier portion 700. More details of each of the hardware assemblies are illustrated in relation to Figure 33. Roller member 710 are provided at the bottom of the assembly,

20 housed in roller housing members 705 and 706 respectively, each of which are intended for a different purpose.

Pins, AP1 through AP4 are provided for the pivoting of the window assemblies when affixed to the carrier portions 700 proximate the hardware 800 thereof. The pins AP1 through AP4 therefore are inserted within cam members

25 found within assemblies 800, which will be described hereinafter. Handle assemblies 900 are provided at the opposite ends of the pivots AP1 through AP4 so as to provide a double acting latching and unlatching mechanism. Proximate each end of the release mechanism 900 are located, portions 908 are best seen in relation to Figure 33 and Figure 41, which engages with the hardware 850

30 disposed proximate the end of the carrier portion 701. Therefore, as previously

described in relation to Figures 14 through 31, the window sashes 620 are carried carrier on portions 700, along the length thereof upon the surfaces of portions 701 and 702 and are latched to prevent pivoting of the window sash 620 via the release mechanism 900 engaged with the hardware 850 proximate the free end of the window sash 620 and which when released as best seen in relation to Figure 41, allows for the pivoting of the window sash 620 upon the pivots AP1 through AP4 causing a camming action and hence a clamping action, as previously described in relation to Figures 14 through 31, to lock the carrier portion proximate the free end of the window sash 620 and the pivotable end of the window sash 620 against the flanges 610(a) of the track 610 and 630(a) of the track 630.

Referring now to Figure 33, there is illustrated in cut away perspective the hardware only of the assembly of Figure 32. Therefore the carrier portion 700 is illustrated, including two portions 701 which are connected by the fasteners shown, through interconnecting portions 703 and locking block 703(a), as best seen in relation to Figure 35. The carrier portion 700 has a generally U-shaped, cross-section, as seen in Figure 35 with a tapered bottom portion extending outwardly away from the U-portion. Again as best seen in Figure 35, the tapered portion is used firstly to provide mounting for the roller 710 and secondly a three dimensional bracing of the window sash 620, unlike the hardware assembly described in Figures 1 through 13. The window sash 620 is therefore further braced by the three dimensional carrier 700. The ends 701(a) and 702(a) of the portion 701 and 702 of the carrier 700 are cut away in cross section, so as allow for the mounting of hardware assemblies 800 and 850 at these cut out locations 701(a) and 702(a) respectively. The hardware located proximate end 702(a) includes, two clamping portions 820 and 810 which are designed to fit within the cut out 702(a), and having contained through the openings disposed through portions 820 and 810, a cam portion 830 having an opening 830(a) for receiving the end of pin AP4, fastened via fasteners F1 and F2 to the window sash 620. The cam portion therefore extends through portion 820 and through

810 and has secured proximate the bottom end thereof, a brake wheel 835 via a pin 835(a) through 830(b). Therefore, as previously described in relation to Figures 1 through 31, as the cam member 830 rotates, not only does it cause a clamping action of the braking surfaces 820 and 810 which have the flanges 610(a) passing therebetween at all times, but the braking wheel is also rotated.

Located within opening 700(a) and 700(b) of carrier portion 702, is disposed a handle portion 840. The handle portion 840 is movable from a position, wherein the handle portion lays substantially flat within the carrier portion 702 proximate the bottom thereof, as best seen in relation to Figure 44, to a position as best seen in relation to Figure 46, where the handle portion is lifted manually by a operator to proximate the top of the opening 708(a). As best seen in relation to Figure 46, the wheel or roller 710 which assist the rolling of the carrier portion 700 upon the bottom of the track portion 610, is mounted within a assembly 706 which includes an opening 706(b) for said roller 710 and an opening 706(c) for the handle portion 840. The handle portion therefore extends through the opening 706 (a) of the roller mounting portion 706 and through the opening 800(c). The handle portion 840 includes end 840(a) accessible to a user, and eccentric 841 proximate the other end thereof, best seen in relation to Figure 46 and mounted within the opening 706(a) via the end of the eccentric 842. The roller 710 is mounted within the opening 706(b) via the pin 710(a) and is therefore moveable with the mounting member 706, as it is moved by the eccentric when handle 840 is moved up and down, to and from its storage location. In doing so, the surface 707 is butted by the eccentric 841 causing the assembly 706 to move forward toward the braking wheel 835 and engage said braking wheel 835 via the surface 708 of the assembly 706. At the same time, the substantially U-shaped band member 838, also mounted to the ends of the lever 840 via pin 842 through openings 838(b) is moved or tightened around the brake wheel 835, so that a braking action between surfaces 708 and 838(a) upon the braking wheel 835 is accomplished, thus preventing the braking wheel from rotating. In do so therefore, the braking wheel 835 will prevent the cam 830 from

rotating, preventing the pivot AP4 from rotating and the window sash 620 from rotating. Therefore, the assembly 800 not only provides for the clamping of the flanges 610(a) of the window assembly, when the window sash 620 is pivoted outwardly away from the track portions 610, but provides an infinite number of
5 positions at which a user may lock the window sash 620(a) once it is pivoted by the binding of the braking wheel 835 between surface 838(a) and 708 preventing the window from pivoting, in substantially any direction and further preventing the carrier portion from sliding within the track as the clamping portions 820 and 810 clamp, the flange 610(a) of the track 610 as previously described in
10 relation the Figures 14 to 31.

Located proximate the other end 701 of the carrier 700, is hardware 850 located within carrier portion 701(a) of the carrier portion 701. The hardware 850 therefore includes a housing 851 which includes a upper clamping portion 852. The housing 851 therefore sits within the recess of 701(a) of the carrier
15 portion 701. Braking the portions 860, having a pebble surface, much the same as previously described in relation to the braking pads of Figures 5(a) and 6(e) and Figure 17, are provided, which include openings proximate the the bottom thereof, for receiving the end 80(a) of an eccentric 880 contained within the housing 851. A pinion, as best seen in relation to Figures 41 and 38 is provided,
20 which also is rotatable mounted on the eccentric 880, and includes gear portions 870(a) engagable with the gear portions 908(a) of the assembly 900. As best seen in relation to Figures 36 through 39 as well as Figure 33, 40 through 43 and specifically Figure 41, when the handle portion 901 is rotated, the gear portion 908(a) will engage or disengage the pinion gear 870 and the gears thereof 870(a),
25 so as to cause, upon the release of the end 908(a) from the hardware 850, the clamping action of the brake pad 860 and the surface 852 to bind therebetween the flange 610(a) of the track 610. This happens because the handle portion 901 is only rotated when it is wished that the window be free to pivot, causing that end of the window 620 to be free from the hardware 850, by the removal of portion
30 908 from the hardware 850 causing the clamping portions to clamp down on the

flange 610(a) by the upward movement, as best seen in relation to Figures 38 and 41 to the pinion gear, except in the case of Figure 41 its the downward movement of the pinion gear, which causes the eccentric to move the brake pads 860 upwardly and at the bottom of opposite clamping surface 852 with the flange 610(a) therebetween. Therefore, the member 908 is releasable from the hardware 850 and upon release thereof causes the the clamping action to clamp the flanges which are provide for clamping to be clamped.

An overview therefore of Figure 33 in relation to Figures 1 through 31 provides a carrier mechanism, which has hardware mounting portions proximate each end thereof, for operations previously described. Therefore the carrier portion is integral when assembled, and does not require pivot blocks or pivot shoes located proximate each end of the window sash, since only hardware necessary for the desired operation is located proximate the ends of the carrier 700 to engage the necessary portions of the window sash provided.

Referring to Figures 34, 34(a) and 35, there is illustrated in top, side, and cross-sectional side views the carrier portion 700 as described in relation to Figure 33, and specifically providing hardware portions 800 and 850 adjacent each end, although many of the detailed parts are not illustrated for simplicity sake. The Figures therefore illustrate the continuity of the carrier portion 700 from proximate one end thereof to proximate the other end thereof, having a substantially uniform cross-section with the exception of the portions provided at 701(a) and 702(a) for mounting hardware 800 and 850. The rollers 710 are disposed within roller housing 705, as best seen in Figure 35. Further the pinion 870 engaging the release portion 908 is seen, as compared to Figure 38, which upon the upward movement of member 908 will cause the pinion to move in that direction and cause the clamping of the flanges 610(a) of the track portion 610.

Referring now to Figures 36 to 39, there is illustrated the close-up of the hardware portions 850 mounted within the carrier portion 700 within the cut out 701(a) thereof. The clamping surface 852 and 860(a) having the flanges 610(a)

disposed therebetween, as illustrated in Figure 37 and the motion of the brake pad 860 in relation to the moveable end 908(a) of the release mechanism 900, is best seen in Figure 38. The end therefore 908(a) is removed from the hardware assembly 850 upon turning the handle 901; the pinion rotates upwardly and
5 because of the eccentric previously described, the brake pad 860 will be moved upwardly toward the other clamping surface 852, as the teeth 908(a) and 870(a) are releasable engagable. When the release mechanism is repositioned within the hardware assembly 850 with an opening 850(a) the pinion will rotate in a downward direction and cause the rotation of the pinion and hence the eccentric
10 880 which will cause the motion of the end of the pin 880(a) in the direction so as to release the clamping of members 860 and 852.

Referring now to Figures 42 and 43, the release assembly 900 is described in detail, having a handle 900 contained within and moveable within a housing 903, the housing 903 as best seen in relation to Figure 33, is rotatable
15 upon a pin 904 and provides thereat a pinion 904(a) which rotates as the handle 901 is rotated. Upon rotation of the pinion 904(a) the racks 905 and 906 can move in an upward and a downward direction and therefore move the ends 905(b) and 906(b) toward the hardware assembly 850 and the cause the pinion 870 to engage the end 908 of the release mechanism, via the teeth or gears thereof 908(a) and
20 870(a), as described previously.

Referring now to Figures 44 through 47, there is illustrated in top, side, and cut away side view, the unique braking mechanism for the pivotable end of the window assembly 620. As described previously, the handle portion 840 is accessible to a user through the opening 700(a) of the carrier portion 702.
25 When the handle portion 840 is moved to the position shown in Figure 46, causing the eccentric portion 841 to engage the engaging surface 707 of the carrier 706 and hence move the end thereof, as best seen in relation to Figure 33, toward the braking wheel 835 and bind the braking wheel in cooperation with the substantially U-shaped band 838, as described previously upon the pivoting of
30 the handle, and independent of the rotation of the cam 830 which as described

previously, causes the clamping action between the members 820 and 810, as seen in Figure 47, within which the flange 610(a) of the track 610 rides.

Therefore, there has been provided a unique hardware assembly heretofore unknown which provides a carrier portion which is continuous
5 between the ends thereof and has disposed proximate the ends thereof, hardware portions for engaging and disengaging the handle portion, and a pivot end of a window assembly, without providing pivot blocks or pivot shoes which are interconnected but, by providing a continuous carrier portion which has hardware mounting provisions proximate each end thereof, for mounting the
10 hardware 850 and 800 respectively.

As many changes can be made to the preferred embodiments of the invention without departing from the scope of the invention; it is intended that all material contained herein be interpreted as illustrative of the invention and not in a limiting sense.